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THE SCOTTISH COUNCIL FOR RESEARCH IN EDUCATION
INTERNATIONAL EXAMINATION INQUIRY

THE PROGNOSTIC VALUE OF
UNIVERSITY ENTRANCE EXAMINATIONS
IN SCOTLAND

THE
PROGNOSTIC VALUE OF
UNIVERSITY ENTRANCE
EXAMINATIONS
IN SCOTLAND

*Scottish Council for
Research in Education*

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PREFATORY NOTE

THE following Report embodies the results of one part of an inquiry into the prognostic value of examinations initiated by the International Institute of Teachers College, Columbia University. It deals with two Scottish examinations, the Preliminary Examination of the Scottish Universities Entrance Board and its principal equivalent, the Leaving Certificate Examination of the Scottish Education Department in relation to success in the Faculties of Arts and Pure Science at the University. A similar inquiry in relation to the Faculty of Medicine is in progress, and the results, when available, will be incorporated in a later issue of this Report. The Committee responsible for the Report desire to record their obligations to the International Institute of Teachers College, under whose auspices their inquiries were carried out; to the University authorities who permitted the use of data relating to their students, to the University officials who extracted the data, and to the Professors and Lecturers who furnished class marks; to the members and officials of the Entrance Board for information about the Preliminary Examination; and to the Scottish Education Department for Teachers' Estimates and Leaving Certificate marks. The expense of the investigation has been borne by the International Institute of Teachers College, Columbia University, New York.

PART I

GENERAL DEDUCTIONS

I

INTRODUCTORY

IN May 1931 the International Institute of Teachers College, Columbia University, with the concurrence and support of the Carnegie Corporation of New York, convened an International Conference at Eastbourne to discuss the place of examinations in modern education and their effect on the structure of modern societies. England was represented at the Conference by Dr P. B. Ballard, Professor Delisle Burns, Professor Cyril Burt, Sir Philip Hartog, Sir Percy Nunn, Sir Michael Sadler, Professor C. E. Spearman, and Dr Graham Wallas; France by M. Barrier, M. Bouglé, M. Cope, M. Declos, and M. Ch. Maurain; Germany by Professor Carl Becker, Dr Otto Bobertag, Professor Erich Hylla, and Dr Robert Ulich; Scotland by Mr W. A. F. Hepburn, Dr Robert R. Rusk, Dr J. C. Smith, and Professor Godfrey H. Thomson (Mr Thomas Henderson, Honorary Secretary to The Scottish Council for Research in Education, was invited to the Conference, but was not able to be present); Switzerland by M. Pierre Bovet; and the United States of America by Dr C. H. Judd, Dr Frederick P. Keppel, Dr Paul Monroe, Dr Henry Suzzallo, and Dr Edward L. Thorndike.¹

¹ On the English Committee Professor Godfrey Thomson has taken the place rendered vacant by the death of Dr Graham Wallas. MM. Gastinel, Laugier, Luc, and R. d'Argila (Secretary) have been added to the French Committee in place of M. Cope, deceased, and M. Maurain. Of the German Committee only Professor Hylla is left; Professor Becker and Dr Bobertag have died, and Dr Ulich is now in America. The Swiss Committee consists of M. Pierre Bovet, Dr W. Brenner, M. Edouard Claparède, M. Robert Dottrens, Dr Charles Junod, M. Albert Malche, M. Jean Piaget, Dr W. Schohaus, Dr Ida Somazzi, Dr Hans Stettbacher, and M. Teodoro Valentini.

A full Report of the proceedings of the Eastbourne Conference has been published by the International Institute of Teachers College under the title of *Conference on Examinations*.¹

Before the Conference dispersed it was agreed that the representatives of each country should undertake certain specific inquiries into their national systems of examination with the object always of elucidating their social effects. The Scottish delegation on its return home was strengthened by the addition of Dr William Boyd, Dr Shepherd Dawson, Professor Drever, Mr D. Kennedy-Fraser, Professor M'Clelland, and Dr John Mackie, and was constituted as the International Examination Inquiry Committee of The Scottish Council for Research in Education. Besides engaging to co-operate generally with the International Institute in its investigation of examinations, the Committee undertook as its immediate contribution (1) to assist in the completion of two minor inquiries already undertaken by The Scottish Council for Research in Education, and (2) to initiate an inquiry into the methods at present employed in Scotland for the selection of pupils for higher education at Secondary Schools and Universities.

The two "minor inquiries" concerned teachers' estimates and the time devoted to examinations. These were completed in the course of session 1931-32; the results were embodied in Research Council Supplement No. 7, and issued with *The Scottish Educational Journal* on 13th May 1932.

The major inquiry branched out at once into two distinct investigations, the one prospective, the other retrospective. The prospective inquiry was suggested by the fact that just before the Eastbourne Conference the Research Council had decided to undertake a mental survey of Scottish school children on an extensive scale. A year was occupied in preparations; then, in the first week of June 1932, a complete age-group of 87,498 children, comprising with negligible exceptions all the children in Scottish schools born in 1921, was tested by means of a Group Intelligence Test devised by Professor Godfrey H. Thomson. In addition, 1000 of these 87,498 children, so taken as to give a representative sample of the whole age-group, were tested individually by means of the Terman revision of the Binet-Simon scale. The individual tests were completed in October 1932,

¹ Bureau of Publications, Teachers College, Columbia University, New York City.

and the results of the whole inquiry were published in 1933 under the title *The Intelligence of Scottish Children : A National Survey of an Age-Group*.¹

All the material collected in this inquiry being accessible in the offices of the Research Council, the Examination Inquiry Committee resolved to keep in touch with the thousand children who had been tested individually, and to follow them up at least to the end of their school courses and where possible into their after-school careers, in the hope of ascertaining how far the promise shown at the age of eleven was fulfilled by subsequent performance. Thanks to the assistance readily given by teachers and education officers, this follow-up is now proceeding systematically, though it will naturally be some years before it yields results of general significance.

The retrospective inquiry promised speedier returns. The Committee therefore decided to confine the investigation to a definite and manageable group of University students, those, namely, who had entered on degree courses in Arts and Pure Science at one of the Scottish Universities in the autumn of 1928, and who ought therefore in most cases to have completed their degrees by the summer of 1932. The object of the retrospective as of the prospective inquiry was simply to elucidate the predictive value of examinations, in this case of the examinations on the strength of which these students had been admitted to graduation courses. The following statement shows the number of cases investigated in different categories:—

	Men.	Women.	Men and Women.
Hons. M.A., graduated . . .	49	36	85
Ord. " " . . .	72	136	208
Hons. M.A., not yet graduated . .	8	4	12
Ord. " " " . . .	70	57	127
Hons. B.Sc., graduated . . .	14	3	17
Ord. " " . . .	2	2	4
B.Sc., not yet graduated . . .	14	3	17
LL.B., " " . . .	2	..	2
Total . . .	231	241	472

¹ University of London Press, Ltd.

The procedure adopted was as follows: Cards were prepared, one for each student, blue for men and cream for women. Details of a student's entrance qualification were entered on the front of his card, details of his University career on the back. (A specimen card is appended to this Report, interleaved between pp. 120-121.) On the original cards these data were entered by the bodies which supplied them, *i.e.* by the University, the Entrance Board, and the Scottish Education Department. But to prevent identification, copies were made of the cards, on which the students' names were omitted and were replaced by running numbers. It was on these copies, and not on the original cards, that the Committee's computers worked. The data thus obtained were assembled, tabulated, and analysed. The results up to June 1933 are presented in this Report, together with such conclusions as the Committee have drawn.

II

CONDITIONS OF ENTRANCE TO SCOTTISH UNIVERSITIES

To readers unfamiliar with the Scottish system this Report will scarcely be intelligible without some explanation of the conditions on which students are admitted to the Scottish Universities.

The Scottish Universities are autonomous, but for purposes of admission they act through a joint board, called the Scottish Universities Entrance Board. Anyone can attend a University class in Scotland on payment of fees; but no one can be admitted to a graduation course, *i.e.* a course leading to a degree, unless he has obtained an attestation of fitness from the Universities Entrance Board, which attestation persons under 21 can obtain, as a rule, only by passing a written test. For this purpose the Entrance Board hold an examination of their own, known as the University Preliminary Examination. But they also accept passes at certain other examinations in lieu of passes at their own "Prelim." Thus a student from England may be admitted to a degree course in Scotland if he possesses qualifications that would admit him to such a course in England. But most of the University students in Scotland have, of course, been at school in Scotland. Hence much the most important equivalent for the University Preliminary Examination is that which is provided by the examination for the Leaving Certificate of the Scottish Education Department.

Not that the Entrance Board accept the Leaving Certificate *as such* in lieu of their own examination. What they accept are passes in separate subjects obtained at the written examination for the Leaving Certificate. (The number and nature of these subjects are described on p. 23 of this Report.) The Leaving Certificate as such is a group certificate, testifying to the successful completion of an approved Secondary course. Not every Leaving Certificate entitles its holder to enter on a University graduating course: he may not have been presented in all the subjects required for

University entrance, or he may have failed in some of them. In the extreme case a candidate debarred from the written examination by illness may nevertheless, on good cause being shown, be awarded a Leaving Certificate; but such a Leaving Certificate would not as a rule count for University entrance. It may be added that the Leaving Certificate is accepted for entrance by many other bodies besides the Scottish Universities Entrance Board, by some without conditions, by others with conditions as to passes in the written papers similar to those imposed by the Entrance Board. A full list of such bodies, 52 in all, will be found on pp. 113 to 115 of the Scottish Education Department's Leaving Certificate Examination Papers, 1934.

The Scottish Leaving Certificate differs from English School Certificates in several respects. (1) In England there are two School Certificates, the First and the Second; in Scotland there is only one. (2) The English First School Certificate may be obtained after four years of Secondary education; the Leaving Certificate requires at least five. (3) English School Certificates are awarded by bodies representing Universities; the Leaving Certificate is awarded by the Scottish Education Department. No doubt the Department may employ University teachers to assist in the work, but the whole responsibility rests with the Department, by whom also the whole cost is borne. Finally, the Leaving Certificate examination differs from other examinations of the kind in the weight which is given to teachers' estimates. When a school submits its list of candidates, the principal teacher in each subject gives a percentage mark to every candidate in that subject, and the Head Teacher gives a letter mark for every candidate's general attainments. When the written tests have been worked by the candidates and marked by the revisers, and the marks standardised by the Chief Examiners, the revisers' marks are entered in columns parallel to the teachers' estimates, and the forms then go to the visiting inspectors. A visiting inspector's business is two-fold: (1) to examine those aspects of his subject which do not lend themselves to written tests, *e.g.* oral proficiency in languages, experimental laboratory work in science; (2) to iron out any discrepancy that has emerged between the teacher's estimate and the reviser's mark, and to decide which of them more nearly represents the candidate's true form. The marks in all subjects are then assembled, and each candidate's claim is assessed on his whole performance, doubtful cases being

referred to a Chief Inspector. The whole procedure aims at retaining the objectivity of a written examination, while reducing the element of chance to which all written examinations are liable. It should be added that in all subjects except English there are two grades, higher and lower; and that every candidate must be presented in English and at least three other subjects, of which one at least must be on the higher grade.¹

The University Preliminary Examination is an external examination conducted by written tests. In Latin, Greek, and Mathematics (but in no other subject) there are two standards, the lower being somewhat below the lower grade of the Leaving Certificate Examination in these subjects. Moreover, there is some prescribed work in languages, whereas the Leaving Certificate tests are all unseen. But the standard of the two examinations is intended to be, and in effect is, the same. If, nevertheless, teachers have till recently regarded the Preliminary Examination as the easier of the two, the reason lies partly in the differences just mentioned, but mainly in the fact that the Preliminary Examination can be passed at two sittings, while the Leaving Certificate, till recently, had to be passed at one sitting. Since 1932, however, the Department have permitted a candidate to be presented in his fourth or a later year in one subject on the lower grade; if he passes, his pass is credited to him. In another respect also there has recently been approximation. Until 1932 the Entrance Board held two Preliminary Examinations each year, one in spring and one in autumn, the spring examination being held about a fortnight before the Leaving Certificate. The spring examination and the Leaving Certificate Examination are now held simultaneously, and the same papers are used in both in all subjects which are common to them.²

The following table shows the part that the Leaving Certificate plays in Scottish education, and its importance as a means of admission to the Scottish Universities.

¹ Throughout this investigation the pass mark for the Leaving Certificate was taken to be 50 per cent. In the University which supplied the data for this investigation the pass mark for the Ordinary Degree and Second Course is 50 per cent., but the pass mark for a Cognate subject is 60 per cent.

² No passage for dictation, however, is given in Modern Languages in the Preliminary Examination.

In Physical Science the Scottish Universities Entrance Board does not accept the combination Physics and Chemistry. Candidates in Physical Science must take Dynamics and Physics, or Dynamics and Chemistry.

TABLE I

*Population of Scotland in 1928	4,848,000
Total School Population in 1928	825,867
*Population of age 18-19 at 1928 approx.	90,000
Number of Pupils in Secondary Schools in 1928 (ages 11 to 18 and over)	81,122
Number of Pupils entered for Leaving Certificate in 1928	4,404
Number of Pupils awarded Leaving Certificate in 1928	2,900
Number admitted to Scottish Universities in 1928 .	2,844
Number admitted to Scottish Universities in 1928 solely on Leaving Certificate	1,593 (56%)
Number admitted to Scottish Universities in 1928 partly by passes in Preliminary Examination and partly by Leaving Certificate passes	256 (9%)

* Estimate supplied by the Registrar-General.

III

COMPARATIVE STATEMENT OF DIFFERENT ENTRANCE QUALIFICATIONS AND UNIVERSITY COURSES

THE following table shows the different entrance qualifications of the 472 students whose cases were investigated, the number of students who entered with each of these qualifications, and the number of those in each category who had by Easter 1933 graduated in Arts or Pure Science with Honours, or without Honours, or had not graduated.

TABLE II

Entered with		M.A. Hons.	M.A. Ord.	M.A., Incom- plete.	B.Sc. Hons.	B.Sc. Ord.	B.Sc., Incom- plete.	LL.B., Incom- plete.	Total.
1.	Leaving Certificate .	59	122	54	14	3	13	1	266
2.	Leaving Certificate and Preliminary Examina- tion	10	41	28		1	2	1	83
3.	Preliminary Examina- tion	7	26	32	2		1		68
4.	Leaving Certificate and English Certificate .			1					1
5.	English or Welsh Certi- ficate	7	14	10	1		1		33
6.	Preliminary Examina- tion and English Cer- tificate		2	3					5
7.	Preliminary Examina- tion and Foreign Certificate		2	1					3
8.	Foreign Certificate .	2		6					8
9.	Other Qualifications .		1	4					5
Total									472

The previous section will have made it clear that either complete or partial exemption from the Preliminary Examination may be secured by passes obtained at other examinations.¹ Of the 472 students under consideration 56 per cent. obtained complete exemption and 18 per cent. obtained partial exemption through the Leaving Certificate; 7 per cent. obtained complete exemption through English or Welsh Certificates; and 14 per cent. entered by way of the Preliminary Examination alone. The importance of the Leaving Certificate as a means of admission is manifest.

TABLE III

Type of Entrance Certificate.	Per-centage Graduated with Honours.	Per-centage with Ordinary Degree.	Per-centage not yet Graduated (Easter 1933).	Total Fre-quency.	Total Per-centage.
Leaving Certificate	27	47	26	266	56
Leaving Certificate and Preliminary Examination .	12	51	37	83	18
Preliminary Examination . . .	12	39	49	68	14
English or Welsh Certificate .	24	43	33	33	7
Others . . .	9	23	68	22	5
Total				472	100

Table III presents some of the same facts as Table II in a different form. It shows for each category of entrance qualification the percentage of students who graduated with Honours, graduated without Honours, or had not graduated at Easter 1933. (For

¹ Partial exemption can no longer be secured by separate passes in examinations for English, Welsh, or Irish School Certificates.

the purpose of this table the categories numbered 4, 6, 7, 8, and 9 in Table II have been put together as "Others.")

It is clear from this table that, judged by the percentage that graduated within four years of first matriculation, students who entered by way of the Scottish Leaving Certificate alone are distinctly superior to those who entered by way of a combination of Leaving Certificate and Preliminary Examination, and still more distinctly superior to those who entered by the Preliminary Examination alone. The group of students entering with Leaving Certificate alone shows the highest percentage of Honours and the lowest percentage of incomplete degrees. Of those who entered by the Preliminary Examination alone almost half had failed to complete their degrees at Easter 1933. The group who entered with a combination of Leaving Certificate and Preliminary Examination take an intermediate position. This is to be expected, for most, though not all, of the students who take the Preliminary Examination are Scottish, and many of these take it in whole or in part because they have failed to obtain at the Leaving Certificate Examination all, or any of, the passes required by the Entrance Board, though it is taken also by a number of students who have not taken a full Secondary School Course, and are therefore ineligible for presentation at the Leaving Certificate Examination.

Table IV shows the University courses taken by pupils who failed in various subjects in the Leaving Certificate but passed them in the University Preliminary (or other) Examination.

There are 49 students in this table. Of these there were 30 who took in their degree course at the University the subject in which they had failed at the Leaving Certificate Examination. Of these 30 there were 24 who passed the Degree Examination either on the Cognate¹ or the Ordinary standard; so that only 20 per cent. of them failed. No students took Honours in a subject in which they had failed at the Leaving Certificate Examination.

¹ See footnote to Table IV.

TABLE IV

Showing subsequent University success of pupils failing in Leaving Certificate but passing in University Preliminary (or other) Examination.

Subject.	Men or Women.	Total.	University Success.				
			Honours. ¹	Cog- nate. ¹	Ordin- ary ¹ Pass.	Ordin- ary Fail.	Did not take Subject at Uni- versity.
English .	M	1					1
	W	2					2
Mathematics	M	5		2			3
	W	13		5	3		5
French .	M	7			1	2	4
	W	11		4	3	2	2
German .	M	2				1	1
	W	1			1		
Science .	M	7			5	1	1
	W						
Totals .		49		11	13	6	19

Note.—In the subjects not given in the table the numbers were too small to be considered.

¹ For the benefit of the reader unfamiliar with the Scottish University system, it may be explained that for the "Ordinary" Degree in Arts the student must pass in 5 subjects on the Ordinary standard, and, in addition, must secure passes on a higher standard in 2 of these subjects, or in 2 subjects regarded as Cognate. The normal length of an Ordinary Degree Course in Arts is three years. A student may elect to follow an "Honours" Course, which usually lasts for 4 years and involves 3 or 4 years' intensive study of a special subject. A student who fails to pass a subject in the Ordinary Degree may attempt it again at a later examination, but the final examination for Honours must be taken within 5 years of first matriculation and may be attempted only once; and on this final examination students may be awarded Honours of the 1st, 2nd, or 3rd Class.

IV

PROGNOSTIC VALUE OF GENERAL ESTIMATES AT SCHOOL-LEAVING AGE

It must be emphasised at the outset that the object of this inquiry was to estimate the *prognostic* or *predictive value* of the qualifications on the strength of which a student enters the University, *i.e.* the extent to which success in entrance examinations, or examinations accepted in lieu thereof, is an augury of success in University studies. The Committee took it for granted that the marks obtained by students at such examinations were a fair measure of their attainments at the time.

The predictive value of any estimate formed of a student before he enters the University can be gauged only by comparing it with his performance at the University. The data for such a comparison are, on the one hand, the Head Teacher's general estimate, the teachers' estimates in special subjects, the collective value of his Leaving Certificate, the number of passes it contains, and the revisers' marks in special subjects; on the other, the class of Honours he obtains if he takes Honours, or if he does not, the marks he obtains in degree and class examinations, the number of years he requires to obtain a degree, and the number of his failures in degree examinations.

It is easy to compare teachers' and revisers' marks in particular subjects with degree and class marks in those same subjects; but a general comparison is more difficult, since the most valuable datum on the University side, *viz.* the class of Honours, applies only to 18 per cent. of the students under consideration. Ordinary degrees are not "classed"; neither are Leaving Certificates; and while it is possible to evaluate Leaving Certificates with some approach to accuracy, the Committee have not found it possible to evaluate Ordinary degrees, in which a subject might have been passed at the first attempt or after repeated failures.

V

PROGNOSTIC VALUE OF HEAD TEACHER'S GENERAL ESTIMATE

IT has been mentioned that when a Head Teacher submits his list of candidates for the Leaving Certificate he expresses his opinion of each by a letter mark. The scale in use is Ex., V.G., G., F.G., F.; or, with + and - refinements, Ex., V.G. +, V.G., V.G. -, G. +, etc. Whatever be the relation of attainment to capacity—and this, in a sense, is the general question at issue—it is obvious that the predictive value of the Head Teacher's opinion depends in the first place on its correctness as an estimate of attainment. Now, though even Head Teachers are fallible, there is little question that their *orders of merit*, based as they are on a fairly long acquaintance with individual pupils and supported by the class teachers' opinions, are almost invariably correct. But a table like Table V combines marks from many "orders of merit." It may be a very useful table if the Head Teachers' standards are all the same; it will be less useful if one man's G. means as much as another's V.G. Such wide differences in standard are not likely to occur among teachers who year by year are brought up against the more objective standard of the Leaving Certificate. Still, in comparing Head Teachers' estimates with University results we must not forget that such differences may, and probably do, exist. Moreover, University success (at least of the highest kind) calls for critical and constructive powers that have scarcely emerged at school. This is true even of subjects that are common to school and University, much more of purely University subjects like Philosophy and Economics.

Table V shows that, on the whole, Head Teachers' estimates are higher for those students who obtained Honours than for those who did not; and among Honours graduates slightly higher for the Firsts than for the Seconds, and for the Seconds than for the Thirds. There is not much difference, however, in

GENERAL DEDUCTIONS

Head Teacher's Opinion.	Honours Degree.									Ordinary Degree.			Incomplete Degree.			Dis-continued.			No Exams. Taken.			Total.				
	1st Class.			2nd Class.			3rd Class.			Total.																
	Men.	Women.	All.	Men.	Women.	All.	Men.	Women.	All.																	
Ex. V.G. +	3	1	4	5	2	7	1	1	9	3	12		2	2				2	1	3	1		1	12	6	18
V.G. -			1	1		1			2		2													2		2
V.G. -	9	9	15	17	12	29	3	1	26	22	48	14	35	49	2	4		6	2	8		1	1	48	62	110
G. +	3		3	6	1	7			9	1	10	2	7	9		1		1		1			1	13	10	23
G. -	5		5	17	5	22	3	2	25	7	32	25	54	79	4	5		3	5	8		1	2	59	68	127
F.G. +					2	2			3	2	2	3	3	6	1	2		1	1	1			1	5	7	12
F.G. -				1		1			1	1	1	2	3	5		1		1	1	1			1	3	5	8
F. +				1		1			1	1	2	13	14	27	3	6		1	2	3			2	20	20	40
F. -									2	2	4					1		1		1				3	3	6
Total	18	10	28	48	22	70	7	4	73	36	109	61	120	181	10	20	14	13	27					165	182	347
1 Median	V.G.	V.G.	V.G.	G. +	V.G.	V.G.	V.G.	G.	V.G.	V.G.	V.G.	G.	G.	G.	G.	F.G. +	V.G.	G.	G.	G.	G. +	G.	G.	G.	G.	G.

No Exams. taken—Those students who sat no degree exams. or of whom no records were available.

Discontinued —Those students whose record did not extend beyond September 1930.

—Those students whose record showed that they sat degree examinations after September 1930, and had not at Easter 1933 completed their degrees.

One card showed no Department's marks, the certificate having been granted on account of illness. It is included above, though not in the composite mark table. Another showed no Head Teacher's estimate and is not included above.

¹ For meaning of statistical terms used here and throughout the remainder of this Report see Appendix IV.

their estimates of those who took Ordinary degrees and of those whose degrees were incomplete at Easter 1933, while their estimates of those who discontinued their courses are comparable, except at the bottom of the scale, with their estimates of the Honours rather than of the Ordinary graduates. This is not surprising; for though some of those who discontinued did so, no doubt, because of repeated failure in examinations, many others had excellent University records, and discontinued in order to enter on other courses or for other good reasons.

The differences between the records of the men and those of the women are slight but significant. Of students with the school mark Excellent, 9 men out of 12 took Honours, but only 3 women out of 6. Of students with school marks V.G. + to V.G. -, 28 out of 50 men and 22 out of 63 women took Honours, while 14 men and 35 women took Ordinary Degrees. Of students with school marks of G. +, G., G. -, 34 men out of 77 took Honours, but only 10 women out of 85. No women with school marks below V.G. got First Class Honours, but 8 men with school marks below V.G. did so. On the whole it seems that boys are more likely than girls to surpass the teacher's estimate when they go to the University in so far as success can be judged by the number who graduate with Honours. It should be noted, however, that the women who do take Honours are quite as successful as the men, and that for professional and economic reasons men are more likely to take an Honours course than women are.

VI

GENERAL PROGNOSTIC VALUE OF LEAVING CERTIFICATE RESULTS

1. *Prognostic Value of Composite Leaving Certificate Mark*

THE task of evaluating Leaving Certificates with different combinations, numbers, and grades of subjects was simplified by the fact that the Committee were concerned only with such Leaving Certificate passes as the Entrance Board accept for admission to degree courses. For this purpose the Entrance Board require passes in four subjects; one subject must be taken from each of the Groups I, II, III, and the fourth from II, III, or IV. The groups are: I. English; II. Mathematics, Dynamics, Physical Science; III. Latin, Greek, French, German, Spanish, Italian, Gaelic; IV. Natural Science, Applied Science, Art, Music. Accordingly, in order to arrive at a Composite Mark, the Committee decided to take four subjects into account, viz. (1) English; (2) the subject in Group II with the highest mark; (3) the subject in Group III with the highest mark; (4) the highest mark among the remaining subjects in any group. A mark on the lower grade was regarded as equivalent to 70 per cent. of the corresponding mark on the higher grade. The method is open to the obvious objection that it makes the questionable assumption that 75 per cent. (say) in one subject is worth as much as 75 per cent. in another; but without that assumption it was found impossible to evaluate Leaving Certificates with different constituents. The distribution of the Composite Leaving Certificate Marks thus obtained among Honours, Ordinary, and Incomplete degrees is shown in Table VI.

Analysis of this table shows that of 43 students with Composite Marks of 70 or over, 28 took Honours of the First or Second Class, 10 took Ordinary degrees, 5 discontinued their courses, and there were none who did not complete; whereas of the 62 students with Composite Marks below 50, 2 obtained Honours, 39 took Ordinary degrees, 11 failed to complete, 6

discontinued, and 4 took no examinations. The mean Composite Mark of Honours graduates is nearly 9 higher than that of Ordinary graduates, which in turn is about 9 higher than that of those who had not completed their degrees, but slightly lower than that of those who discontinued.

First Class Honours men have a decidedly lower mean Composite Mark than First Class Honours women, while among Third Class Honours graduates the reverse holds. There is no significant difference between men and women in other categories.

These results do not differ materially from those of Table V, but they are somewhat more definite, and the data are somewhat more objective. No doubt revisers as well as Head Teachers are fallible, but their personal equations have been discounted as far as possible by the Chief Examiners, who standardise their marking in each subject, and it is on these standardised marks that the Composite Leaving Certificate Mark is based.

2. Prognostic Value of the Number of Higher Grade Leaving Certificate Passes obtained at First Sitting

It might be felt that a Composite Leaving Certificate Mark based on four subjects only is unfair to candidates who take more than four subjects, and who might, it may be argued, have achieved a higher average mark if they had confined themselves to four subjects. The Committee have therefore framed Tables VII (α) and VII (β), in which is shown the number of Higher Grade passes obtained at the first sitting by Honours and Ordinary graduates, and Table VII (γ) which shows the number of times students with 0-5 Highers in the Leaving Certificate Examination failed in degree examinations. On qualifying for the award of a Leaving Certificate some pupils proceed to the University at once, others return to school for another year, and generally obtain additional passes at the end of it. Since the object of this part of the inquiry was to ascertain the *predictive* value of the number of Leaving Certificate passes, it seemed better to ignore such additional passes, and to reckon only the passes obtained at the first sitting, so as to get a fairer comparison.

TABLE VII (α)

Showing the number of Highers obtained in the Leaving Certificate at the *first sitting* by Honours, Ordinary, and “not yet graduated” students.

Number of Highers.	Degree.			Total.
	Hons.	Ordinary.	Not yet Graduated.	
0	0	0	2	2
1	0	13	12	25
2	16	66	30	112
3	28	52	32	112
4	26	27	19	72
5	12	7	5	24
Total . .	82	165	100	347
Mean number of Highers . .	3.41	2.69	2.69	2.8

Note.—Table II shows 349 students entering with Leaving Certificates, but that number includes 2 students who were granted Group Certificates under Section 8 of the Leaving Certificate Regulations after sitting one or two subjects. These are not included in Table VII (α).

Table VII (β) gives the same information in percentage form.

TABLE VII (β)

Number of Highers.	Degree.		
	Honours.	Ordinary.	Not yet Graduated.
0	0.0	0.0	2.0
1	0.0	7.9	11.9
2	19.5	40.0	30.7
3	34.2	31.5	31.7
4	31.7	16.4	18.8
5	14.6	4.2	4.9
	100.0	100.0	100.0

The distributions given in Table VII (β) are shown graphically in fig. 1.

Percentage
Frequency

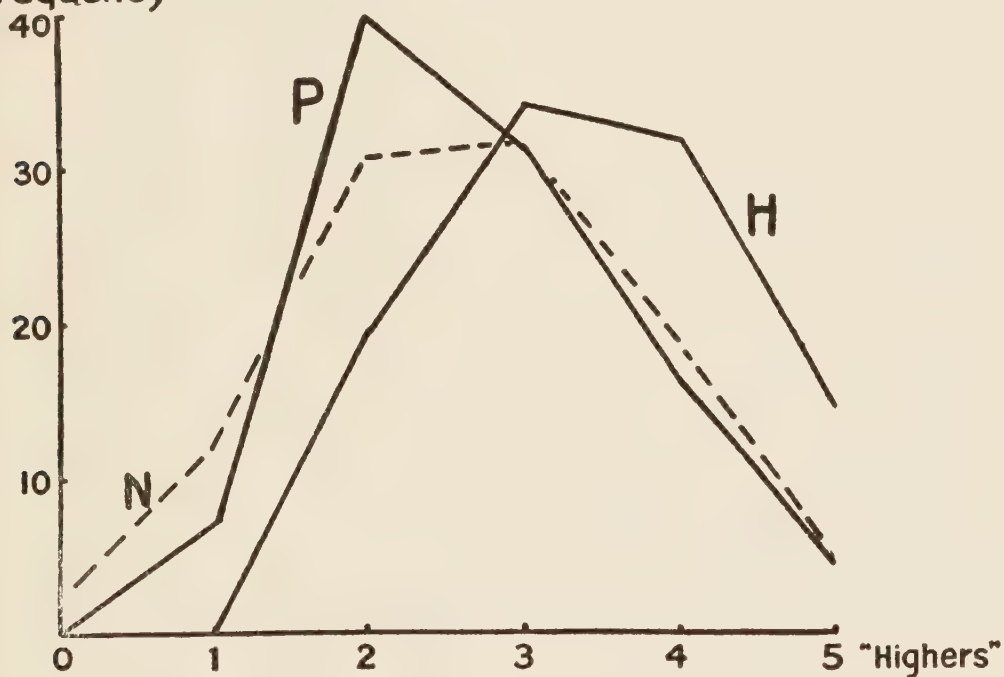


FIG. 1.—Percentage frequency polygon showing number of "Honours" (H), "Pass" (P), and "Not yet graduated" (N) students who had 0, 1, 2, 3, 4, or 5 "Highers" (at the first sitting) in the Leaving Certificate examination.

Table VII (α) shows that the average number of Higher Grade passes obtained at the Leaving Certificate examination at first sitting was highest among those who afterwards graduated with Honours, and that there is no difference between the averages of the other two groups. The distributions given in Table VII (β), and shown graphically in fig. 1, indicate clearly the superiority of the Honours group in this respect and the similarity between the other two groups.

Table VII (γ) shows that the mean number of failures in degree examinations increases as the number of Leaving Certificate Higher Grade passes decreases. If the number of such passes is very large, the number of failures is likely to be small, whereas with no Higher Grade passes or one Higher Grade pass a large number of failures is common. The number of failures among those with 2 or 3 Higher Grade passes varies considerably.

If Table VII (δ) be compared with Table VII (γ) it will be seen that of the 205 failures recorded against students who had gained 3 Higher Grade passes in the Leaving Certificate examination, no fewer than 103 are due to 14 individuals: the average for the remainder is very little over one failure per student.

TABLE VII (γ)

Table showing the number of failures in degree examinations, up to and including those held in October 1933, of students who gained 0, 1, 2, 3, 4, 5 Highers at their first presentation.

No. of Highers.	Number of Failures in Degree Exams.																Freq.	Mean Number of Fails.	St. Dev.	
	0.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.				16.
0	1			1	2			1										5	3.60	2.24
1	4	5	3	1	3	2	1		2	1	1		1			1		25	4.16	4.03
2	36	16	17	7	8	4	5	4	3	1	1	3	1		1	2		109	2.87	3.56
3	45	21	14	7	8	3	1	5	2	2				1				109	1.88	2.53
4	51	10	6	3	1											1		72	0.71	2.03
5	18	2																20	0.10	
																		340		

The above table does not include the less academic subjects such as Art as Highers. Additional subjects such as Elementary Analysis, Geometry, and Dynamics, and one case of Gaelic are not included.

This table does not include students whose University career was not entered on the record cards; Table VII (α) includes them.

Mean number of failures = 2.01. Standard deviation = 2.92.

TABLE VII (δ)
Cases of Individual Discrepancy

TABLE VII (8)																												
Cases of Individual Discrepancy																												
Number of Failures in Individual Univ. Degree Exams.																												
Subjects. ¹	Subjects for B.Sc. Degree.																											
	English (Ord.).	English (2nd Co.).	Hist. (Ord.).	Econ. Hist. (Ord.).	French (Ord.).	French (2nd Co.).	Latin (Ord.).	Phil. (Ord.).	Mor. Phil. (Ord.).	Psychol. (Ord.).	Pol. Econ. (Ord.).	Geog. (Ord.).	Maths. (Ord.).	Maths (2nd Co.).	Nat. Phil. (Ord.).	Chem. (Ord.).	Maths. I.	Maths. II.	Chem. I.	Chem. II.	Chem. III.	N. Phil. I.	N. Phil. II.	Zoo. I.	Zoo. II.	Geol. I.	Botany.	
	2	4	2	1	8	4	6	6	2	3	4	3		2	2	3	1	2	4	5	4	4	12	2	4	1	2	103

To 1932.
1933 onwards.

¹ E = English; M = Mathematics; F = French; G = German; L = Latin; S = Science; A = Art.

Table VII (e) and fig. 2 show that the more Higher Grade passes a pupil gained, whether at one or more sittings, the higher on the average were his marks in particular subjects.

TABLE VII (e)

Showing frequency and mean Leaving Certificate mark in various subjects of pupils awarded 1, 2, 3, 4, etc. Highers in Leaving Certificate examination.

No. of Highers.	English.		Latin.		French.		German.		Science.	
	<i>n.</i>	Mean.	<i>n.</i>	Mean.	<i>n.</i>	Mean.	<i>n.</i>	Mean.	<i>n.</i>	Mean.
1	18	57.5			10	46.6				
2	56	59.20	3	57.00	42	55.69			12	53.33
3	74	59.18	18	56.45	52	55.73	4	61.0	22	56.73
4	103	55.69	55	58.49	84	62.48	19	63.63	34	59.15
5	58	63.88	43	61.95	50	65.12	17	66.88	23	62.87
6	14	61.93	10	64.3	20	66.90	3	68.0	14	70.0
7	6	63.33	2	62.5	8	60.0			8	66.38
8	2	70.5	2	72.0	2	66			2	74.0

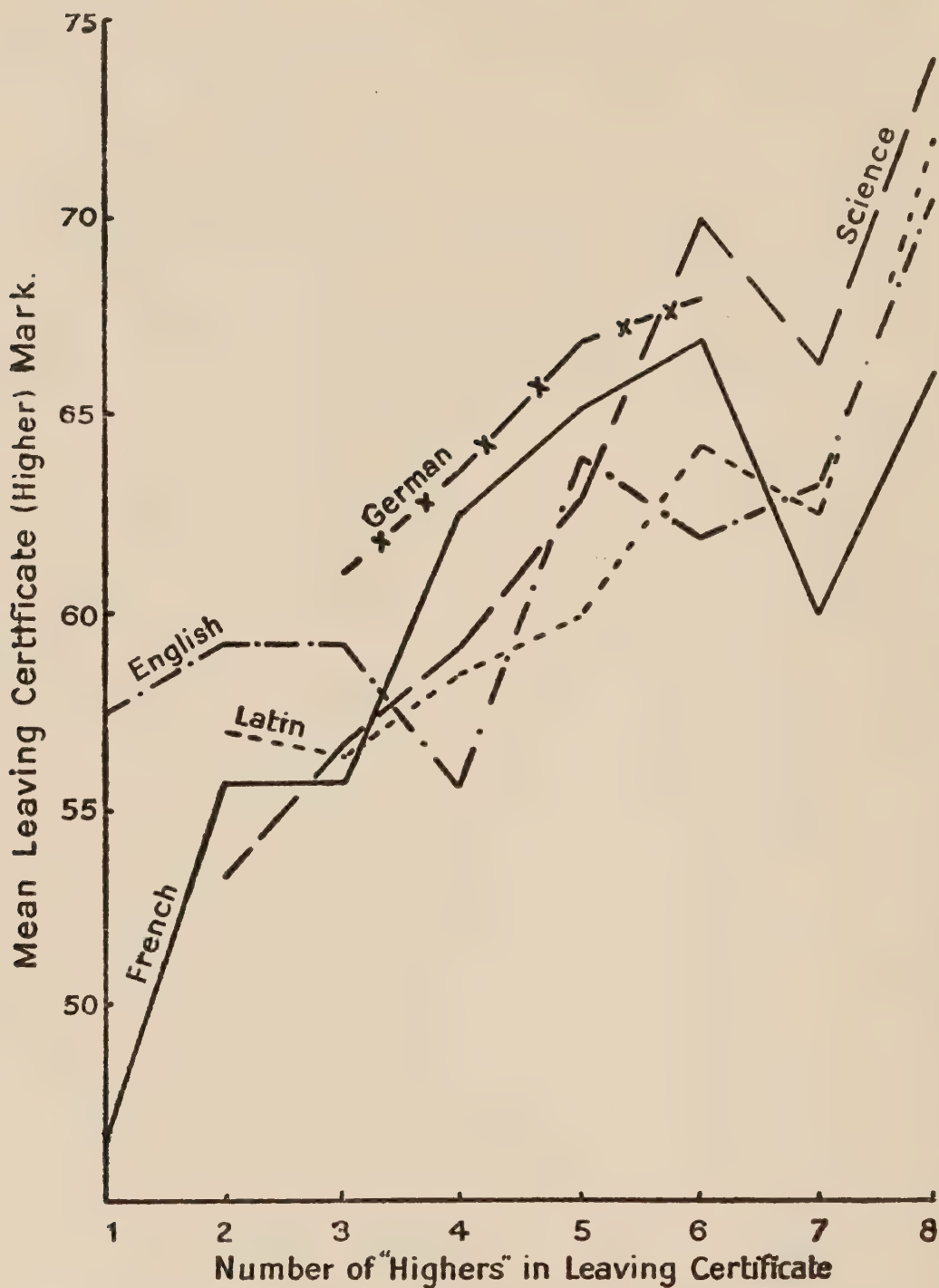


FIG. 2.—Showing relationship between mean Leaving Certificate examination (Higher) mark in English, Latin, French, German, and Science, and the number of "Highers" in the Leaving Certificate.

VII

EFFECT ON UNIVERSITY RESULTS OF REMAINING FOR AN ADDITIONAL YEAR AT SCHOOL AFTER QUALIFYING FOR LEAVING CERTIFICATE

It has been mentioned (p. 25) that pupils who have "qualified for the award of a Leaving Certificate" not infrequently return to school for another year, at the end of which they often obtain additional Leaving Certificate passes. Some of them spend this extra year in preparation for the Bursary Competition¹ of the Universities, others in preliminary training for the teaching profession. What effect has the added year on success at the University?

It is clear from Table VIII that pupils who aim at Honours commonly take an additional year at school: of the 94 Honours students under investigation 84 did so. Of those who graduated 91 per cent. of the Honours students remained an additional year and 56 per cent. of the Ordinary graduates. Of 74 pupils who took the additional year 70 gained First or Second Class Honours, whereas 6 out of 7 who did not take the additional year were likewise awarded First or Second Class Honours. The number of the latter is so small that comparisons are unreliable. When we consider those who took Ordinary degrees we find that of 128 who took the extra year at school 43 had not completed their degree in 1934, and of 98 who did not take the extra year 32 had not completed their degree at the same time. The proportions are nearly the same, so that no conclusion can be drawn regarding the value of the extra year at school.

The fact that 91 per cent. of the Honours students and 56 per cent. of the Ordinary degree students had an extra year at school might suggest that the extra year has been an advantage. But it should be remembered that this affords no proof of the advantage of the additional year. Table IX shows that the Honours students on the whole qualify for the award of the Leaving Certificate at an earlier age than the Ordinary degree students, which is an indication of superior native capacity, and their success at the University may be due to this natural superiority rather than to the additional year at school.

¹ *I.e.* competition for entrance scholarships.

TABLE VIII

Showing the number of students who entered the University immediately on attaining the Leaving Certificate and those who remained an additional year at school, and the University successes of the respective groups.

	Hons. Degree.				Ord. De- gree.	Incomplete.		
	1st Class.	2nd Class.	3rd Class.	Total.		Hons.	Ord.	Total.
Entered University on attaining Leaving Certificate . . .	1	5	1	7	66	3	32	35
Remained at school after attaining Leav- ing Certificate, adding no subject . . .	4	17	..	22 ¹	21	1	12	13
Remained at school after attaining Leav- ing Certificate, adding subjects	15	34	4	53	64	8	31	39

¹ One was awarded Honours but no class was shown.

Note.—Totals differ from those of Table II, as only those who actually gained the Leaving Certificate are included.

VIII

RELATION BETWEEN AGE AT ENTRANCE TO THE UNIVERSITY AND NUMBER OF YEARS REQUIRED FOR GRADUATION

TABLE IX

Showing ages of students on entrance to the University and the
number of years taken to complete their degree

Age at Entrance.	Pass Degree.		Hons. 4 Years.	Pass Degree.		Hons. 4 Years.
	3 Years.	4 Years.		3 Years.	4 Years.	
Years.				%	%	%
16-16 $\frac{1}{2}$	3	0	0	1.8	0.0	0.0
17-17 $\frac{1}{2}$	41	16	23	24.7	34.8	22.5
18-18 $\frac{1}{2}$	76	14	53	45.8	30.4	52.0
19-19 $\frac{1}{2}$	30	12	21	18.1	26.1	20.6
20-20 $\frac{1}{2}$	10	1	2	6.0	2.2	2.0
21-21 $\frac{1}{2}$	2	1	1	1.2	2.2	1.0
22-22 $\frac{1}{2}$	1	1	..	0.6	2.2	..
23-23 $\frac{1}{2}$	2	..	..	1.2	..	..
24-24 $\frac{1}{2}$	..	..	2	..	..	2.0
25-25 $\frac{1}{2}$	..	..	..	..	..	..
26-26 $\frac{1}{2}$	..	..	..	..	..	..
27-27 $\frac{1}{2}$	1	1	..	0.6	2.2	..
Mean age in years .	18.69	18.80	18.67			
σ in years .	1.30	1.44	1.13			

The first column of Table IX gives the age at entrance to the University of students who took three or four years to

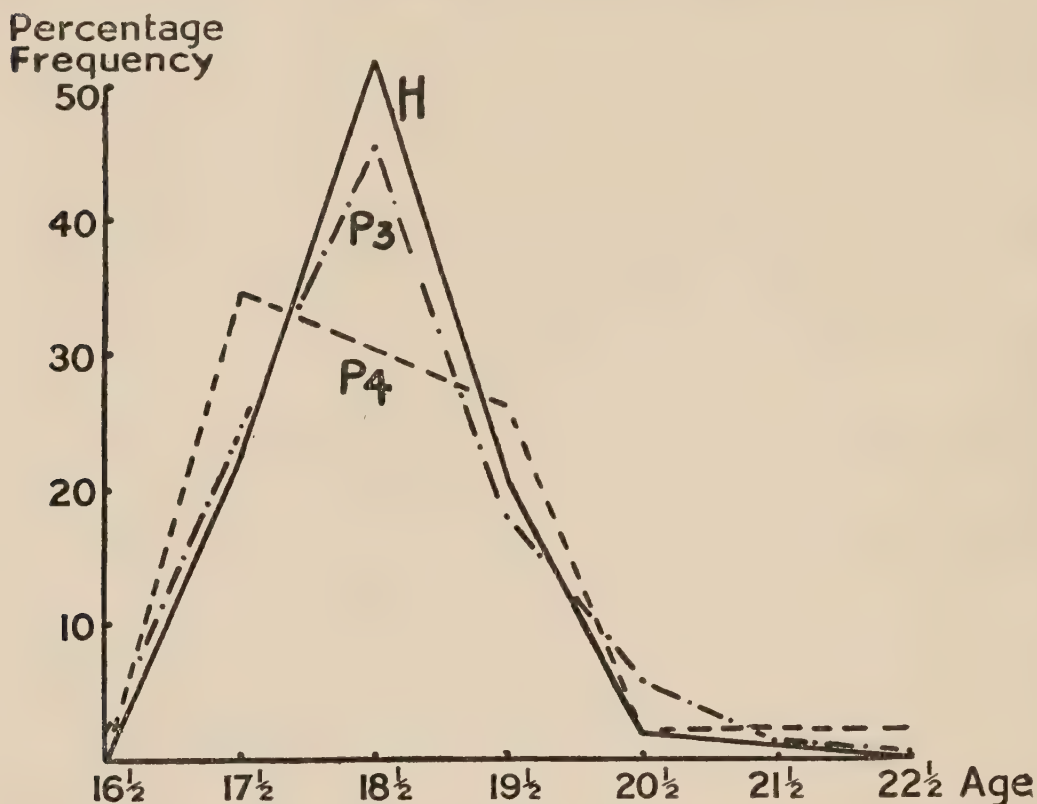


FIG. 3.—Percentage frequency polygon showing age at entrance to University and years taken to graduate.

H=Honours group—4 years to graduate.

P₃=Pass „ —3 „ „

P₄= „ „ —4 „ „

graduate; the last three columns give the same data in percentages, and these percentages are shown graphically in fig. 3.

The average age at entrance to the University of the students who graduated with Honours was 18 years 8 months, which is the same as that of those who took a Pass degree in three years, and only a month less than that of those who took a Pass degree in four years. There is very little difference in the dispersions of the three groups; the greatest is that of the Pass students who took four years to graduate.

The similarity of the three groups in mean age at entrance to the University is interesting in view of the fact that there is a greater tendency among the Honours students than among the others to remain at school for a year after the completion of the Leaving Certificate.

IX

INFLUENCE OF EMPLOYMENT DURING UNIVERSITY COURSE ON NUMBER OF YEARS REQUIRED FOR GRADUATION

OF the 472 students under investigation 17 reported themselves as employed during their University course, but only in one instance was it found that the duration of the course was affected by such employment.

PART II

DEDUCTIONS REGARDING INDIVIDUAL SUBJECTS

I

DATA AVAILABLE

So far we have dealt with the predictive value of general estimates of attainment at the leaving-school age, as represented by the Head Teacher's opinion, the Composite Leaving Certificate Mark, and the number of Higher Grade passes gained at first sitting. It remains to consider how far estimates of school attainments in individual subjects are predictive of University success in those subjects or in others.

The data available for comparison are (A) Teachers' estimates, (B) Department's marks, (C) marks in University class examinations, (D) marks in degree examinations. A and B are compared in Tables X to XIV in respect of Leaving Certificate English, Mathematics, Latin, French, and Science, all on the Higher Grade. C and D are compared in Tables XV to XIX in respect of University Ordinary English, Mathematics, Latin, French, and German. These two sets of comparisons have no predictive value, but they are interesting for other reasons. Predictive value belongs to Tables XX to XXXVII, in which A and B on the one hand are compared with C and D on the other.

II

CORRELATION BETWEEN DEPARTMENT'S MARK AND TEACHER'S ESTIMATE IN SAME SUBJECT

TABLE X

ENGLISH

Teacher's Estimate

Department's Mark	40-43	44-47	48-51	52-55	56-59	60-63	64-67	68-71	72-75	76-79	80-83	84-87	88-91	Totals.
81-84						1	1			1			1	4
77-80						2	3		3					8
73-76					1	3	2	3	4		2			15
69-72			1	1	4	5	6	3	4	2				26
65-68			2	2	8	10	7	6	7	7	1			50
61-64			2	3	10	16	9	3	3			1		47
57-60			3	9	15	13	14	4	6					64
53-56			7	16	12	11	7	6	3					62
49-52	1	1	3	13	14	7	5	1						45
45-48			3	5	1									9
41-44			1	1										2
Totals	1	1	22	50	65	68	54	26	30	10	3	1	1	332

$$r = .52$$

$$PE_r = .027$$

TABLE XI

MATHEMATICS

Teacher's Estimate

Department's Mark	35-38	39-42	43-46	47-50	51-54	55-58	59-62	63-66	67-70	71-74	75-78	79-82	83-86	87-90	Totals.
97-100														1	1
93-96											1	1			2
89-92									3		1	1	1		6
85-88						1		1			1	2	1		6
81-84						1	3	2	4	1	1	1	1	1	15
77-80					1	2		4	4	1	4	1			17
73-76					1	4		1	4	2	4	3	1		20
69-72				1	4	5	5	1	4	7					27
65-68		1		1	1		11	4	5	2	1				26
61-64			2	2	4	8	7	2	4	1	1				31
57-60		1		5	3	8	4	4	4	1	1				31
53-56			1	3	6	6	9	2	1	1	2				31
49-52				3	6	5	6	3			1		1		25
45-48				3	4	3	1								11
41-44					2	2	1								5
37-40					3			1							4
33-36	1		1		1	1		1							5
29-32					1										1
Totals	1	2	4	18	37	46	47	26	33	16	18	9	5	2	264

$$r = .58$$

$$PE_r = .028$$

TABLE XII

LATIN

Teacher's Estimate

	34-37	38-41	42-45	46-49	50-53	54-57	58-61	62-65	66-69	70-73	74-77	78-81	82-85	Totals.
90-93											1			1
86-89														0
82-85													1	1
78-81					2	1				1				4
74-77					3	1	2	1	3	2	3			15
70-73						3	3	4	2	2				14
66-69					7	8	3	2	1	1				22
62-65					6	11	5	6	1	2	1			32
58-61				1	8	4	4	5	3	1				26
54-57			1		18	6	5	5	2		1			38
50-53			1	1	11	8	6	3	3	2				35
46-49	1				5	2	1	1						10
42-45			1			2	1	1						5
38-41	1		1		3			1		1				7
34-37		1		1		2								4
30-33					1			1		1				3
26-29		1												1
Totals	2	2	4	3	64	48	30	30	15	13	6	0	1	218

$r = .37$
 $PE_r = .04$

TABLE XIII

FRENCH

Teacher's Estimate

	33-35	36-38	39-41	42-44	45-47	48-50	51-53	54-56	57-59	60-62	63-65	66-68	69-71	72-74	75-77	78-80	Totals.
87-89															1		1
84-86																	0
81-83															1	1	2
78-80							1				1		2		1		5
75-77												2	2		1		5
72-74							1			3	5		1	3	3	2	18
69-71								4	1	3	1	4	3	1	3	4	24
66-68						1	2		1	2	5	5	4	5	3		28
63-65							4	2	1	8	4	1	2	2	1		25
60-62						1	1	3	6	7	3	1	5				27
57-59			1		1	1	3	6	5	4	3	3	1				28
54-56						3	3	6	2	5	5	1					25
51-53						2	3	10	1	7		2	1		1		27
48-50			2			3	3	4	8	2	2						24
45-47						1	1	2	1	1					1		7
42-44			1				2	4	2								9
39-41						1				1	1						3
36-38	1							1			1						3
33-35		1	1														2
Totals	1	1	5	0	1	13	24	42	28	43	31	19	21	11	16	7	263

$$r = .60$$

$$PE_r = .077$$

TABLE XIV

SCIENCE

Teacher's Estimate

Department's Mark	Teacher's Estimate														Totals.
	39-41	42-44	45-47	48-50	51-53	54-56	57-59	60-62	63-65	66-68	69-71	72-74	75-77	78-80	
93-95														1	1
90-92													1		2
87-89															0
84-86															0
81-83											1				1
78-80									1				1	1	5
75-77							2						3		5
72-74							1	3				2		1	8
69-71								3			2				5
66-68					1	2	1				2	1			7
63-65					1	1	1	4	1	2	1	1			12
60-62					1	2	1	3	3	1					11
57-59					1	2	3	3	2	1	3				15
54-56				1	2	6	5	3	2						19
51-53				2	1	3	1	5			1				13
48-50	1			5	6	3	5	1				1			22
45-47				1	1										2
42-44								1							1
39-41					1										1
Totals	1	0	0	9	15	19	17	26	12	4	10	5	5	2	130

$$r = .69$$

$$PE_r = .031$$

While the mean marks in these two estimates, Department's mark and Teacher's estimate, differ very slightly (see p. 82), the dispersions differ more widely, being greater in the former.

The correlations in the various subjects are as follows:—

<i>Subject</i>	<i>r</i>	<i>PE_r</i>
English . . .	.52	.027
Mathematics . . .	.58	.027
Latin . . .	.37	.040
French . . .	.60	.077
Science . . .	.69	.031

Except in Science, these values of r are not very high. It must be remembered, however, that in dealing with selected groups even a low correlation coefficient may be significant. And these groups are small and selected, since they include only those who gained the Leaving Certificate. Had they included also those who failed, the correlation coefficients would probably have been higher. Moreover, we must allow for the natural disinclination of teachers to give marks below 50 to pupils who, they think, have a chance of passing.

III

RELATION BETWEEN DEGREE EXAMINATION MARK AND UNIVERSITY CLASS EXAMINATION MARK IN SAME SUBJECT

THE following tables show (α) the mean, standard deviation, etc., of degree and class marks in English, Mathematics, Latin, French, and German, and (β) the correlations between these marks.

TABLE XV (α)

ENGLISH

Showing mean, standard deviation, etc., of degree and class marks in English (Ordinary).

		Frequency.	Mean Mark.	Standard Deviation.	Standard Error of Mean.
Men and Women	Degree Exams.	216	57.5	9.1	.6
Men		78	58.4	10.1	1.1
Women		138	57.0	8.6	.7
Men and Women	Class Exams.	216	55.3	7.9	.5
Men		78	56.9	8.7	1.0
Women		138	54.4	7.3	.6

TABLE XV (β)

ENGLISH

Showing distribution of degree and class marks in English
(Ordinary).

Degree Marks

	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	Totals.
80-84													
75-79										1			1
70-74							3			4	3		10
65-69					1		1	2	6	6	1		17
60-64						1	1	9	10	8	5		34
55-59						1	8	8	17	11	6		51
50-54					3	6	15	16	7	8			55
45-49	1	1		4	6	7	3	3	3	1			29
40-44				1	3	5	4		1	1			15
35-39						1	2		1				4
30-34													
Totals	1	1		5	13	21	34	41	45	40	15		216

$r = .57$
 $PE_r = .031$

TABLE XVI (a)

MATHEMATICS

Showing mean, standard deviation, etc., of degree and class marks in Mathematics (Ordinary).

		Frequency.	Mean Mark.	Standard Deviation.	Standard Error of Mean.
Men and Women	Degree Exams.	81	54·5	18·9	2·1
Men		44	55·2	18·0	2·7
Women		37	53·8	20·0	3·3
Men and Women	Class Exams.	81	31·1	8·1	·9
Men		44	30·4	8·1	1·2
Women		37	32·1	8·1	1·3

This table refers only to those students whose marks in degree examinations were given (*i.e.* non-exempt, etc., see p. 55).

TABLE XVI (β)

MATHEMATICS

Showing distribution of degree examination and class marks in Mathematics of those who did not gain exemption from the degree examination.

Class Marks	Degree Marks																	Totals
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	
50-54																		
45-49												1				2	1	4
40-44											1			2	2		2	7
35-39							1	2	2	2			2	1	1	2	1	18
30-34					1		2	2	2	3	3	2	1	2	4		1	23
25-29				1			1	3	2	1	3	2						13
20-24									2	1			1				1	5
15-19		1			1	1		1	2	2	1			1				10
10-14							1											1
5-9																		
0-4																		
Totals	1		1	2	1		5	8	10	9	8	5	4	6	7	4	3	81

$r = .51$
 $PE_r = .055$

TABLE XVII (a)

LATIN

Showing mean, standard deviation, etc., of degree and class marks in Latin (Ordinary).

		Frequency.	Mean Mark.	Standard Deviation.	Standard Error of Mean.
Men and Women	Degree Exams.	151	59.9	13.6	1.1
Men		73	63.0	12.8	1.5
Women		78	56.9	13.7	1.6
Men and Women	Class Exams.	151	56.0	13.1	1.1
Men		73	57.3	12.3	1.4
Women		78	54.8	13.6	1.5

TABLE XVII (β)

LATIN

Showing distribution of degree and class marks in Latin
(Ordinary).

Degree Marks

	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	Totals.
Class Marks															
90-94														1	1
85-89															
80-84											2		3		5
75-79											2	4	1		7
70-74									1	2	2	2	1		8
65-69									2	5	6	3			16
60-64						2		4	4	8	2	1			21
55-59					2	1	4	4	6	3	4	1		1	26
50-54					1	3	8	3	6	1	1		1	1	25
45-49				1	1	1	4	3	1	2	1				14
40-44			1	3	3	4	2			1					14
35-39		2	1		1	1				1					6
30-34			1	1	1										3
25-29						1	1								2
20-24	1				2										3
Totals	1	2	3	5	11	13	19	14	20	23	20	11	6	3	151

$$r = .75$$

$$PE_r = .024$$

TABLE XVIII (a)

FRENCH

Showing mean, standard deviation, etc., of degree and class marks in French (Ordinary).

		Frequency.	Mean Mark.	Standard Deviation.	Standard Error of Mean.
Men and Women	Degree Exams.	215	55.9	15.1	1.0
Men		63	56.7	16.0	2.0
Women		152	55.6	14.7	1.2
Men and Women	Class Exams.	215	55.3	13.1	.9
Men		63	54.1	11.9	1.5
Women		152	55.8	13.5	1.1

TABLE XVIII (β)

FRENCH

Showing distribution of degree and class marks in French
(Ordinary).

Degree Marks

	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	Totals.
Class Marks																	
95-99													1				1
90-94											1		1	1			3
85-89									1			1					2
80-84											2			1			3
75-79									2					6	2	1	11
70-74											1	2	2	2			7
65-69									1	4	3	5	4	1			18
60-64							1	2	5	3	8	3	5	1			28
55-59					1		4	13	6	6	3	1					34
50-54			1	4	4	3	3	6	7	5	2	1					36
45-49		1	1	2	2	2	6	7	4	3	2						29
40-44		1	1	2	4	3	1	6	2								20
35-39	1	1	3	1	2	3	3		2								16
30-34			1		1	1	1										4
25-29						2											2
20-24				1													1
Totals	1	2	7	10	14	14	19	34	27	24	22	13	13	12	2	1	215

$$r = .76$$

$$PE_r = .019$$

TABLE XIX (a)

GERMAN

Showing mean, standard deviation, etc., of degree and class marks in German (Ordinary).

		Frequency.	Mean Mark.	Standard Deviation.	Standard Error of Mean.
Men and Women	Degree Exams.	47	61.8	9.1	1.3
Men		9	58.4	9.9	3.3
Women		38	62.6	8.7	1.4
Men and Women	Class Exams.	47	67.0	7.5	1.1
Men		9	65.9	7.4	2.5
Women		38	67.3	7.5	1.2

TABLE XIX (β)

GERMAN

Showing distribution of degree and class marks in German
(Ordinary).

Degree Marks

	40-43	44-47	48-51	52-55	56-59	60-63	64-67	68-71	72-75	76-79	Totals
Class Marks											
80-83										1	1
76-79								1	1	2	4
72-75								6	2		8
68-71					2	3	7				12
64-67			2		3	1	2	1			9
60-63		1	2	1		1					5
56-59		1	2	1	1	1					6
52-55				1							1
48-51											0
44-47											0
40-43	1										1
Totals	1	2	6	3	6	6	9	8	3	3	47

$$r = .85 \quad PE_r = .028$$

It will be observed that with the exception of German the average mark in degree examinations is generally higher than the average mark in class examinations. The difference, however, is comparatively slight in all subjects except Mathematics, where it is very great. In Mathematics students who have made more than a certain percentage in class examinations are exempted from the degree examination altogether. Only students who were not thus exempted are included in the tables here.

The correlations are high, ranging from .51 to .85, the explanation doubtless being that one individual, the professor, participates in both estimates. They are:

Subject.	r .	PE_r .
English . . . .	.57	.031
Mathematics . . .	.51	.055
Latin . . . . .	.75	.024
French . . . . .	.76	.019
German . . . . .	.85	.028

IV

RELATION OF DEPARTMENT'S MARKS AND TEACHERS' MARKS TO UNIVERSITY DEGREE AND CLASS MARKS IN INDIVIDUAL SUBJECTS

IN the following tables the Department's marks and the teachers' marks in English, Mathematics, Latin, and French are collated with the marks obtained in these subjects by the same students in University class examinations and in the examinations for Ordinary degrees at first sitting. The Department's marks are compared with degree marks in Tables XX to XXIII, and with class marks in Tables XXVIII to XXXI; the teachers' marks are compared with degree marks in Tables XXIV to XXVII, and with class marks in Tables XXXII to XXXV. The results of these comparisons are summarised in Tables XXXVI and XXXVII, and certain conclusions are then drawn as to the predictive value of Department's marks and teachers' marks in the several subjects.

In the case of Mathematics, comparisons between Department's or teachers' marks and degree marks are made difficult by the fact already mentioned, that students who have reached a good standard in class examinations are exempted from the degree examination. These comparisons have accordingly been supplemented by Tables XXI (β) and XXV (β), which show the distribution of Department's marks and teachers' marks among those who were exempted from the degree examination, those who passed in it, and those who failed.

IV (a)

DEPARTMENT'S MARKS AND DEGREE MARKS

TABLE XX

ENGLISH

Showing distribution of Department's marks in Leaving Certificate examination in English and degree marks in First Ordinary English.

		Degree Marks									
		38-41	42-45	46-49	50-53	54-57	58-61	62-65	66-69	70-73	Totals.
Department's Marks	80-83								2		2
	76-79		1			2	1	1	1	2	8
	72-75				1	1	1	4	3		10
	68-71			1	1	2	3		3	4	14
	64-67				4	5	8	6	5	1	29
	60-63			2		5	7	4	3	1	22
	56-59	1	2	3	4	6	2	9	5		32
	52-55	1	2	5	9	2	2	3	1	2	27
	48-51	3		2		2		2		1	10
Totals		5	5	13	19	25	24	29	23	11	154

$r = .36$
 $PE_r = .047$

TABLE XXI (a)

MATHEMATICS

Showing distribution of Department's marks in Leaving Certificate examination in Higher Mathematics and degree examination in First Ordinary Mathematics.

		Degree Marks																		Totals.
		5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	
Department's Marks	90-94															1	1			2
	85-89																			
	80-84							1				1		1					1	4
	75-79											1			2	1				4
	70-74	1						2		1	1				1		1		2	9
	65-69							2	2	1					1	1			1	8
	60-64					1	1		3			2	2	2		1	1		1	14
	55-59				1		1		1	2	1			2		2		1		11
	50-54				1		1	1	2	1	2	1			2				1	12
	45-49							1								1				2
	40-44										1							1		2
	35-39										1									1
	30-34								1	1										2
	25-29																			
20-24			1																1	
Totals		1	1	2	1	5	7	8	7	6	5	4	5	7	4	3	5	1	72	

$r = .30$
 $PE_r = .072$

Degree marks: $M = 54.8$; $\sigma = 19.4$; $\sigma_m = 2.3$
Department's marks: $M = 61.4$; $\sigma = 13.0$; $\sigma_m = 1.5$

M = mean. . σ = standard deviation
 σ_m = standard error of the mean

TABLE XXI (β)

MATHEMATICS

Showing distribution of Department's marks in Leaving Certificate examination in Higher Mathematics by those who passed, failed, or were exempted from the degree examination in First Ordinary Mathematics.

Mean mark for all = 64.5

Department's Marks for Leaving Certificate (Higher).	Men and Women.				Men.				Women.			
	Pass.	Fail.	Exempt.	Non-Exempt.	Pass.	Fail.	Exempt.	Non-Exempt.	Pass.	Fail.	Exempt.	Non-Exempt.
95-99			1				1					
90-94	1		2	1			1		1		1	1
85-89			4				3				1	
80-84	3	1	9	4	3		3	3		1	6	1
75-79	4		8	4	1		2	1	3		6	3
70-74	6	3	13	9	4	2	7	6	2	1	6	3
65-69	3	5	20	8	1	2	9	3	2	3	11	5
60-64	11	3	5	14	6	1	3	7	5	2	2	7
55-59	9	2	10	11	7		3	7	2	2	7	4
50-54	9	3	10	12	5	2	6	7	4	1	4	5
45-49	1	1	1	2	1			1		1	1	1
40-44	2		2	2	1		1	1	1		1	1
35-39	1		1	1					1		1	1
30-34	1	1	1	2		1		1	1		1	1
25-29												
20-24		1		1						1		1
15-19												
Means	61.4	59.6	67.4	60.9	62	59.5	68.4	61.5	61.1	59.5	66.5	60.5
Freq.	51	20	87	71	29	8	39	37	22	12	48	34

TABLE XXII

LATIN

Showing distribution of Department's marks in Leaving Certificate examination in Higher Latin and degree marks in Ordinary Latin.

		Degree Marks										Totals.	
		35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84		85-89
Department's Marks	90-94											1	1
	85-89												
	80-84								1	1	1		3
	75-79								3	2	1		6
	70-74						1	1	5	2		1	10
	65-69						2	3	2	1		1	9
	60-64				2	2	2	1	5	2			14
	55-59	1		1	1	4	2	7	3	1			20
	50-54			3	1	3	4	1	4	2	1		19
	45-49			1									1
	40-44	1	1										2
	35-39					1							1
	30-34				1								1
Totals		2	1	5	5	10	11	13	23	11	3	3	87

$r = .59$

$PE_r = .047$

$r = .59$ $PE_r = .047$

Degree marks: $M = 66.0$; $\sigma = 10.9$; $\sigma_m = 1.17$

Department's marks: $M = 61.1$; $\sigma = 10.5$; $\sigma_m = 1.12$

TABLE XXIII

FRENCH

Showing distribution of Department's marks in Leaving Certificate examination in Higher French and degree marks in Ordinary French.

		Degree Marks														Totals.		
		20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89		90-94	
Department's Marks	75-79									1			1	1	1		4	
	70-74				1				3	1	4	6	5	6	1		27	
	65-69						2	3	3	1	4	3	4	2		1	23	
	60-64				1	1	5	4	8	6	3	1	1	2			32	
	55-59			2	2	4	3	6	1	3	5	2	1				29	
	50-54	1	1	1	1	2		8	5	5	3						27	
	45-49		1	1			1	1		1							5	
	40-44			1	2	2	2			1							8	
	35-39					1		1	1								3	
Totals		1	2	5	7	10	13	23	21	19	19	12	12	11	2	1	158	
		$r = .59$ $PE_r = .035$																

$r = .59$ $PE_r = .035$

Degree marks: $M = 59.0$; $\sigma = 14.3$; $\sigma_m = 1.14$

Department's marks: $M = 60.2$; $\sigma = 9.2$; $\sigma_m = 0.73$

IV (b)

TEACHERS' MARKS AND DEGREE MARKS

TABLE XXIV

ENGLISH

Showing distribution of teachers' marks in English for Leaving Certificate and degree marks in First Ordinary English.

Degree Marks

	36-39	40-43	44-47	48-51	52-55	56-59	60-63	64-67	68-71	72-75	76-79	Totals.
84-87									1			1
80-83							1	1				2
76-79			1		2	1	1	2			1	8
72-75				1	1	3	2	1	1			9
68-71			1		2	2	1	4	6			16
64-67			1	2	1	4	6	6	8	2		30
60-63			2	3	5	9	6	7	1			33
56-59		4	2	5	2	4	6	2				25
52-55	2	1	2		4	5	3	2	1			20
48-51		1		3	1		2					7
44-47	1									1		2
Totals	3	6	9	14	18	28	28	25	18	3	1	153

$$r = .42$$

$$PE_r = .045$$

TABLE XXV (a)

MATHEMATICS

Showing distribution of teachers' marks in Higher Mathematics for Leaving Certificate and degree marks in Ordinary Mathematics.

		Degree Marks																	Totals.	
		5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89		90-94
Teachers' Marks	85-89																			
	80-84																			2
	75-79																			1
	70-74																			8
	65-69																			9
	60-64																			14
	55-59	1			1	1	1	2		1	3		1	2	1	2	1	3		17
	50-54							1	3	4	3	2				3		1	1	18
45-49																				
Totals		1			2	1	5	6	8	8	6	4	4	4	7	4	3	5	1	69

$r = .08$
 $PE_r = .081$

Degree marks: $M = 55.3$; $\sigma = 19.1$; $\sigma_m = 2.3$
Teachers' marks: $M = 62.1$; $\sigma = 9.8$; $\sigma_m = 1.2$

TABLE XXV (β)

MATHEMATICS

Showing distribution of teachers' marks in Higher Mathematics for Leaving Certificate by those who passed, failed, or were exempt from sitting the Ordinary degree examination in Mathematics.

Teachers' Marks.	Men and Women.				Men.				Women.			
	Pass.	Fail.	Exempt.	Non-Exempt.	Pass.	Fail.	Exempt.	Non-Exempt.	Pass.	Fail.	Exempt.	Non-Exempt.
90-94			1				1					
85-89			4				2				2	
80-84	2		3	2	2		1	2			2	
75-79	1		8	1	1		6	1			2	
70-74	7	1	14	8	4	1	4	5	3		10	3
65-69	5	3	11	8	2	2	3	4	3	1	8	4
60-64	7	7	16	14	2	2	9	4	5	5	7	10
55-59	11	6	13	17	8	1	5	9	3	5	8	8
50-54	17	1	11	18	9	1	8	10	8		3	8
Freq.	50	18	81	68	28	7	39	35	22	11	42	33
Means	60.4	61.2	66.1	60.6	61.1	62.7	65.6	61.4	59.5	60.2	66.5	60.0

TABLE XXVI

LATIN

Showing distribution of teachers' marks in Higher Latin for Leaving Certificate and degree marks in Ordinary Latin.

		Degree Marks												Totals.
		30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	
Teachers' Marks	90-94													
	85-89											1		1
	80-84													
	75-79										2		1	3
	70-74					1			1	2	2	1	1	8
	65-69				1			2	4	4	2			13
	60-64				1			2	2	4	3	1	1	14
	55-59				1	1	2		1	2	1			8
	50-54		1		2	2	4	2	3	3				17
	45-49													
Totals			1		5	4	6	6	11	15	10	3	3	64

$r = .53$
 $PE_r = .061$

Degree marks: $M = 67.0$; $\sigma = 11.0$; $\sigma_m = 1.38$
Teachers' marks: $M = 62.0$; $\sigma = 8.2$; $\sigma_m = 1.03$

TABLE XXVII

FRENCH

Showing distribution of Teachers' marks in Higher French for Leaving Certificate and degree marks in Ordinary French.

Degree Marks

	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	Totals.
80-84												1	1	1		3
75-79								1		2	2	4	1		1	11
70-74						1	1	3	1	2	1	3	6	1		19
65-69				1		3	3	5	2	2	3	1	2			22
60-64					2	2	5	4	4	7	2	2				28
55-59		1	1	2	4	1	6	6	8	6	2	1	1			39
50-54	1	1	2	2	2	3	8	2	2		2					25
45-49						1										1
40-44					1	1										2
35-39					1											1
Totals	1	2	3	5	10	12	23	21	17	19	12	12	11	2	1	151

$$r = .59$$

$$PE_r = .036$$

Degree marks: $M = 59.7$; $\sigma = 14.0$; $\sigma_m = 1.14$

Teachers' marks: $M = 62.0$; $\sigma = 8.6$; $\sigma_m = 0.70$

IV (c)

DEPARTMENT'S MARKS AND CLASS MARKS

TABLE XXVIII (a)

ENGLISH

Showing mean, standard deviation, etc., of Department's marks in Leaving Certificate for English and University class examination marks in Ordinary English.

		Frequency.	Mean Mark.	Standard Deviation.	Standard Error of Mean.
Class Marks.	Men and Women	158	56.1	7.8	.6
	Men	55	58.1	8.1	1.1
	Women	103	54.9	7.3	.7
Department's Marks.	Men and Women	158	61.4	7.6	.6
	Men	55	62.1	8.1	1.1
	Women	103	61.0	7.2	.7

TABLE XXVIII (β)

ENGLISH

Showing distribution of Department's marks in Leaving Certificate for English and University class examination marks in Ordinary English.

		Class Marks													
		36-39	40-43	44-47	48-51	52-55	56-59	60-63	64-67	68-71	72-75	76-79	80-83	84-87	Totals.
Department's Marks	84-87														
	80-83														2
	76-79														7
	72-75														8
	68-71														15
	64-67														30
	60-63														21
	56-59	2	1	3	5	9	8	5	1						34
	52-55	2	2	3	6	12	2	3	1						31
48-51		1	1	2	3	2	1								10
Totals		4	4	10	24	40	27	22	14	8	5				158

$$r = .46$$

$$PE_r = .042$$

TABLE XXIX (a)

MATHEMATICS

Showing mean, standard deviation, etc., of Department's marks in Leaving Certificate for Higher Mathematics and University class marks in Ordinary Mathematics.

	Frequency.	Mean Mark.	Standard Deviation.	Standard Error of Mean.
Class Marks	158	45·9	16·9	1·4
Department's Marks	158	64·5	13·0	1·0

TABLE XXIX (β)

MATHEMATICS

Showing distribution of Department's marks in Leaving Certificate for Higher Mathematics and University class marks in Mathematics (Ordinary Arts and Science).

Class Marks

	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	Totals.
95-99																		1	1
90-94						1	1						1						3
85-89										1	2							1	4
80-84				1	2	1	2		2			3	1	1					13
75-79				1	1		2	2	1	1	2			1	1				12
70-74		3			2	4		2	3	2	3		1	1			1		22
65-69		1		3	1	1	4	3	5	3	2	2	2	1					28
60-64		1	1	2	5	2	1	2	1	1	2	1							19
55-59	1		1		5	3	3	2	1	2	3								21
50-54		3		4	3	1	2	4	2	1	1		1						22
45-49					1		1		1										3
40-44			1			1	1	1											4
35-39					1				1										2
30-34			1			1		1											3
25-29																			0
20-24				1															1
Totals	1	8	4	12	21	15	17	17	17	11	15	6	6	4	1		1	2	158

$$r = .37$$

$$PE_r = .046$$

TABLE XXX (a)

LATIN

Showing mean, standard deviation, etc., of Department's marks in Leaving Certificate for Higher Latin and of University class examination marks in Ordinary Latin.

		Frequency.	Mean Mark.	Standard Deviation.	Standard Error of Mean.
Class Marks.	Men and Women	87	60.6	11.9	1.3
	Men	41	60.9	11.2	1.8
	Women	46	60.3	12.2	1.8
Department's Marks.	Men and Women	87	60.4	10.4	1.1
	Men	41	61.5	10.1	1.5
	Women	46	59.4	10.6	1.6

TABLE XXX (β)

LATIN

Showing distribution of marks gained at Leaving Certificate examination in Higher Latin and in University class examination in Ordinary Latin.

Class Marks

	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	Totals.
Department's Marks															
90-94							1								1
85-89															
80-84									2	1					3
75-79							1		1	1		1			4
70-74							1		4		2	2		1	10
65-69						2	1	2	4						9
60-64					2	1	4	2	2	1	1				13
55-59			1	1	4	1	3	7		3	1				21
50-54	1			1	1	6	2	1	5	1	1	1			20
45-49			1												1
40-44		1		1			1								3
35-39						1									1
30-34						1									1
Totals	1	1	2	3	7	12	14	12	18	7	5	4	1		87

$$r = .44$$

$$PE_r = .058$$

TABLE XXXI (a)

FRENCH

Showing mean, standard deviation, etc., of Department's marks in Leaving Certificate for Higher French and University class examination marks in Ordinary French.

		Frequency.	Mean Mark.	Standard Deviation.	Standard Error of Mean.
Class Marks.	Men and Women	158	57.8	11.6	.9
	Men	43	58.1	11.9	1.8
	Women	115	57.7	11.5	1.1
Department's Marks.	Men and Women	158	60.2	9.2	.7
	Men	43	58.9	10.0	1.5
	Women	115	60.7	8.7	.8

TABLE XXXI (β)

FRENCH

Showing distribution of Department's marks in Leaving Certificate in Higher French and University class examination marks in Ordinary French.

Class Marks

	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	Totals.
Department's Marks																	
85-89																	
80-84																	
75-79									1	1		2					4
70-74							3	4	6	7	3	3	1				27
65-69							2	4	4	5	3	3			1	1	23
60-64			1	1	4	9	4	7	3	3	1	2					32
55-59		1	2		6	7	8	2	1				2				29
50-54			1	5	4	6	7	2	1			1					27
45-49				2		1	1	1									5
40-44		1	1	1	4				1								8
35-39				1		1											3
30-34																	
Totals		2	8	7	19	29	28	24	18	7	11	3		1	1		158

$r = .53$
 $PE_r = .038$

IV (d)

TEACHERS' MARKS AND CLASS MARKS

TABLE XXXII (a)

ENGLISH

Showing mean, standard deviation, etc., of Teachers' marks in Leaving Certificate for English and University class examination marks in Ordinary English.

		Frequency.	Mean Mark.	Standard Deviation.	Standard Error of Mean.
Class Marks.	Men and Women	158	56.1	7.8	.6
	Men	55	58.1	8.1	1.1
	Women	103	54.9	7.3	.7
Teachers' Marks.	Men and Women	158	62.9	7.8	.6
	Men	55	64.0	8.1	1.1
	Women	103	62.3	7.5	.7

TABLE XXXII (β)

ENGLISH

Showing distribution of Teachers' marks in Leaving Certificate for English and University class examination marks in Ordinary English.

		Class Marks										Totals.
		36-39	40-43	44-47	48-51	52-55	56-59	60-63	64-67	68-71	72-75	
Teachers' Marks	84-87										1	1
	80-83							2				2
	76-79				1		2	2		2	1	8
	72-75				1	3		1	5	3	1	14
	68-71			1	1	4	3	1	3	1		14
	64-67				2	10	11	3	3		1	30
	60-63	2		2	5	12	2	9	1	2		35
	56-59	1		4	7	5	4	2	2			25
	52-55		2	2	3	6	3	1		1	1	19
	48-51	1	1	1	4		2					9
	44-47		1									1
Totals		4	4	10	24	40	27	21	14	9	5	158

$r = .50$
 $PE_r = .04$

TABLE XXXIII (a)

MATHEMATICS

Showing distribution of marks in University class examination in Ordinary Mathematics.

Class Marks.	Men and Women.				Men.				Women.			
	Pass.	Fail.	Exempt.	Non-Exempt.	Pass.	Fail.	Exempt.	Non-Exempt.	Pass.	Fail.	Exempt.	Non-Exempt.
95-99			2				2					
90-94			1				1					
85-89			1								1	
80-84			2				1				1	
75-79			5				1				4	
70-74			6				3				3	
65-69			8				5				3	
60-64			16				6				10	
55-59			14				7				7	
50-54			17				7				10	
45-49	4		15	4	1		6	1	3		9	3
40-44	7		11	7	4		7	4	3		4	3
35-39	14	4	1	18	7	3	1	10	7	1		8
30-34	17	6		23	9	3		12	8	3		11
25-29	8	5		13	6			6	2	5		7
20-24	5			5	4			4	1			1
15-19	4	6		10	3	4		7	1	2		3
10-14		1		1						1		1
5-9												
0-4												
Mean	32.8	26.8	58.3	30.1	31.3	27.5	58.4	30.4	35.0	26.2	58.2	32.1
	Mean for all = 45.6				Mean for all = 44.9				Mean for all = 47.3			

TABLE XXXIII (β)

MATHEMATICS

Showing distribution of Teachers' marks for Leaving Certificate in Higher Mathematics and University class examination marks in Ordinary Mathematics.

Class Marks

	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	Totals.
Teachers' Marks																			
90-94																		1	1
85-89							1			1	1	1							4
80-84				1	1						2		1						5
75-79					1			3	1	1	1						1	1	9
70-74	1				2	4	2	3	3	1	1	1	1	2	1				22
65-69			1	1	2	3	4	3	3					2					19
60-64	3	1	3	4	2	2	1	2	4	2	2	4							30
55-59	1	3	2	1	4	4	4	1	3	2	4	1							30
50-54	1			5	7	2	3	4	3	1	3								29
45-49																			
Totals	1	8	4	11	21	15	16	15	15	10	14	5	6	4	1		1	2	149

$$r = .34$$

$$PE_r = .049$$

University Class marks: $M = 45.6$; $\sigma = 17.2$; $\sigma_m = 1.4$

Teachers' marks: $M = 63.6$; $\sigma = 9.5$; $\sigma_m = 0.8$

TABLE XXXIV (a)

LATIN

Showing mean, standard deviation, etc., of Teachers' marks for Leaving Certificate in Higher Latin and University class examination marks in Ordinary Latin.

		Frequency.	Mean Mark.	Standard Deviation.	Standard Error of Mean.
Class Marks.	Men and Women	64	60.6	12.4	1.6
	Men	34	61.0	10.6	1.8
	Women	30	60.2	14.1	2.6
Teachers' Marks.	Men and Women	64	61.5	8.4	1.0
	Men	34	62.7	8.5	1.5
	Women	30	60.0	7.8	1.4

TABLE XXXIV (β)

LATIN

Showing distribution of Teachers' marks for Higher Latin at Leaving Certificate examination and University class examination marks in Ordinary Latin.

	Class Marks														Totals.
	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	
Teachers' Marks															
85-89										1					1
80-84															
75-79							1		1	1					3
70-74						2		1	2		1	1			7
65-69			1		2	1	3		2	2	1				12
60-64					1	1	1	2	2	1	2	2		1	13
55-59				1	3		3	2	1						10
50-54	1		1	1		3	3	3	4	1					17
45-49				1											1
40-44															
Totals	1		2	3	6	7	11	8	12	6	4	3		1	64

$$r = .30$$

$$PE_r = .077$$

TABLE XXXV (a)

FRENCH

Showing mean, standard deviation, etc., of Teachers' marks for Leaving Certificate in Higher French and University class examination marks in Ordinary French.

		Frequency.	Mean Mark.	Standard Deviation.	Standard Error of Mean.
Class Marks.	Men and Women	151	58.2	11.8	1.0
	Men	42	58.1	12.1	1.9
	Women	109	58.3	11.9	1.1
Teachers' Marks.	Men and Women	151	62.0	8.6	.7
	Men	42	59.5	8.1	1.3
	Women	109	62.2	8.7	.8

TABLE XXXV (β)

FRENCH

Showing distribution of Teachers' marks for Leaving Certificate in Higher French and University class examination marks in Ordinary French.

Class Marks

	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	Totals.
85-89																	
80-84											2	1					3
75-79							2		2	3	1	1	1		1		11
70-74							1	4	6	1	1	5				1	19
65-69				1		1	6	3	3	4	2	1			1		22
60-64				2	1	2	5	5	7	4	1		1				28
55-59		1	1	2	6	8	7	6	5			2	1				39
50-54			3	3	8	4	5	1	1								25
45-49							1										1
40-44				1	1												2
35-39				1													1
30-34																	
Totals		1	9	7	17	26	25	25	18	7	10	3		2	1		151

$$r = .58$$

$$PE_r = .036$$

IV (e)

SUMMARY OF MEANS, CORRELATIONS, ETC.

TABLE XXXVI

Summary of frequencies, means, standard deviations, and standard errors of the mean for English, Mathematics, Latin, and French.

(Men and Women)

	English.				Mathematics.				Latin.				French.			
	<i>n.</i>	M.	σ .	σ_m .	<i>n.</i>	M.	σ .	σ_m .	<i>n.</i>	M.	σ .	σ_m .	<i>n.</i>	M.	σ .	σ_m .
Teacher's Mark	158	62.9	7.8	.62	69	62.1	9.8	1.18	64	62.0	8.2	1.03	151	62.0	8.6	0.70
					149	63.6	9.5	.78	64	61.5	8.4	1.04	151	62.0	8.6	0.70
Department's Mark	158	61.4	7.6	.60	72	61.4	13.0	1.53	87	61.1	10.5	1.12	158	60.2	9.2	0.73
					158	64.5	13.0	1.04	87	60.4	10.4	1.12	158	60.2	9.2	0.73
Degree Mark					81	54.5	18.9	2.10	151	59.9	13.6	1.11	215	55.9	15.1	1.03
	216	57.5	9.1	.62	69	55.3	19.1	2.29	64	67.0	11.0	1.38	151	59.7	14.0	1.14
					72	54.8	19.4	2.28	87	66.0	10.9	1.17	158	59.0	14.3	1.14
University Class Mark	216	55.3	7.9	.54	81	31.1	8.1	.90	151	56.0	13.1	1.06	215	55.3	13.1	.89
	158	56.1	7.8	.62	149	45.6	17.2	1.41	64	60.6	12.4	1.55	151	58.2	11.8	1.00
	158	56.0	7.7	.60	158	45.9	16.9	1.35	87	60.6	11.9	1.27	158	57.8	11.6	.90

Differences between frequencies, means, etc., in the same subject and in the same examination are due to the fact that the groups of students are different; for example, the 69 in the top row in the Mathematics column are students who were not exempted from the degree examination, while the 149 in the next row include also those who were exempted.

TABLE XXXVII

Summary of correlations in English, Mathematics, Latin, and French.

Correlations.	English.			Mathematics.			Latin.			French.		
	<i>n.</i>	<i>r.</i>	PE _{r.}	<i>n.</i>	<i>r.</i>	PE _{r.}	<i>n.</i>	<i>r.</i>	PE _{r.}	<i>n.</i>	<i>r.</i>	PE _{r.}
Teacher's Mark and Department's Mark . .	332	·52	·03	264	·58	·03	218	·37	·04	263	·60	·08
Degree Mark and University Class Mark . .	216	·57	·03	*81	·51	·06	151	·75	·02	215	·76	·02
Teacher's Mark and Degree Mark . .	153	·42	·05	*69	·08	·08	64	·53	·06	151	·59	·04
Department's Mark and Degree Mark . .	154	·36	·05	*72	·30	·07	87	·59	·05	158	·59	·04
Teacher's Mark and University Class Mark . .	158	·50	·04	149	·34	·05	64	·30	·08	151	·58	·04
Department's Mark and University Class Mark . .	158	·46	·04	158	·37	·05	87	·44	·06	158	·53	·04

* These frequencies are small owing to the fact that a considerable number of students gained exemption from the degree examinations.

Analysis of the first of these summaries shows that on the whole the mean marks in English, Mathematics, and French decrease in the following order: (1) Teacher's Mark, (2) Department's Mark, (3) Degree Mark, (4) University Class Mark. There is not much difference between (1) and (2), nor between (3) and (4), except in Mathematics, where the gap is so considerable as to suggest that the basis of marking employed for University class examinations in Mathematics is different from that employed in the other subjects. The gap between (2) and (3), however, is considerable, except in Latin.

Again, except in English, the "scatter" of the University marks is larger than the "scatter" of the school marks, whether as given by the teachers or by the Department. This is in accordance with what is generally found when mental and

scholastic tests are given to school children—scatter usually increases with age.

These tables show a significant difference between the means of the men and women in only two cases, namely, in the University degree examination in Latin and the University class examination in English, and in each case the mean of the men is higher.

In an attempt to estimate the predictive value of teachers' and Department's marks, the Summary of Correlations is specially important. As might be expected, the correlations between teacher's mark and Department's mark on the one hand, and between degree mark and University class mark on the other, are higher than the correlations between either of the former pair and either of the latter, with one exception: in Latin the correlation between teacher's mark and Department's mark is lower than that between Department's mark and University class mark.

There is no significant difference between the prognostic value of teachers' marks and that of the Department's marks for success either in the University class examinations or in the degree examinations; the slight differences that appear in the table are not statistically significant. Another striking fact is the smallness of some of the correlation coefficients in Mathematics, English, and Latin; the coefficient in degree Mathematics was influenced by the fact that students who have reached a good standard in class examinations are exempted from the degree examination. All the correlations have indeed been affected by the fact that the data refer only to the pupils who were successful at the Leaving Certificate examination. In considering the value of the teacher's estimate one has to bear in mind that it can hardly fail to have been influenced by his experience of the objective standard of the Leaving Certificate examination.

V

RELATION BETWEEN LEAVING CERTIFICATE MARKS IN INDIVIDUAL SUBJECTS AND UNIVERSITY SUCCESS IN THESE AND OTHER SUBJECTS

IN the preceding section teachers' marks and Leaving Certificate marks in certain subjects were compared with degree marks and University class marks in the same subjects. In this section an attempt will be made to ascertain the predictive value of the Leaving Certificate mark in a particular subject more definitely by comparing it with the subsequent performance of the student both in that subject and in others.

Tables XXXVIII-XLIV show the mean Leaving Certificate marks in English, Mathematics, Latin, Greek, French, German, and Science obtained by those who

- (1) Took Honours in other subjects;
- (2) Proceeded to Honours in the subject at the University;
- (3) Took a double course in it;
- (4) Passed in it for the Ordinary degree;
- (5) Failed in it for the Ordinary degree;
- (6) Did not take it at the University.

The inferences to be drawn from each table are summarised after the table, and some points of special interest are noted at the end of the section.

TABLE XXXVIII

Showing mean, standard deviation, etc., of Leaving Certificate mark in English of students in various types of University courses.

Mean Leaving Certificate (Higher) mark in English for all = 60.62

		Passes.		Passes.		Fail.	Non-English. ²
		Honours Course in Subjects other than English.	Honours Course in English.	2nd Course in English. ¹	1st Ordinary Course in English.	1st Ordinary Course in English.	
Men and Women	M	63.75	67.56	63.64	60.19	54.90	59.68
	σ	8.26	6.18	7.25	7.25	5.79	9.64
	σ_m	1.10	1.21	0.95	0.85	1.93	0.70
	n	56	27	58	73	10	188
Men	M	63.26	66.00	61.44	61.55	53.33	59.39
	σ	8.82	5.92	7.59	8.71	..	7.99
	σ_m	1.99	1.53	1.96	1.99	..	0.76
	n	39	16	16	20	3	109
Women	M	64.89	69.82	64.48	59.68	55.57	60.09
	σ	6.66	5.96	6.83	6.42	6.51	8.28
	σ_m	1.67	1.88	1.05	0.90	2.7	0.93
	n	17	11	42	53	7	79

M = mean. σ = standard deviation.

σ_m = standard error of the mean. n = frequency.

¹ Intermediate Honours English students.

² Those who did not take English in their University course. The numbers in this column are large, because English is compulsory for the Leaving Certificate but not for the M.A., and has no place in the B.Sc. course.

The highest average mark is that of the English Honours graduates; next come those who took Honours in other subjects; then those who passed a second course in English; then those who passed First Ordinary English and those who took no English at the University; those who failed in English come last.

This is what one would expect. It should be noted, however, that though Honours graduates in English have a higher average Leaving Certificate mark in English than Honours graduates in other subjects taken collectively, they are surpassed (see Table LII) by the students who took Honours in Modern Languages. It might be too much to say that some students attempt Honours

in English not because they have a special bent for English, but because they have no special bent for any other subject; but it is clear that some of those who do best in English at school proceed to Honours in other subjects at the University.

The averages of the women are a little higher than those of the men, except in the group that passed in First Ordinary English, but the differences are not statistically significant.

TABLE XXXIX

Showing mean, standard deviation, etc., in Mathematics.

Mean Leaving Certificate (Higher) mark in Mathematics for all = 63.44

		Passes.		Passes.		Fail.	Non-Matematics.
		Honours Course in Subjects other than Mathematics.	Honours Course in Mathematics.	2nd Course in Mathematics.	1st Ordinary Course in Mathematics.	1st Ordinary Course in Mathematics.	
Men and Women	M	64.18	72.16	63.09	67.35	66.00	60.97
	σ	8.57	13.02	13.07	11.76	..	11.04
	σ_m	1.01	3.82	1.50	1.51	..	1.01
	n	60	13	83	61	3	115
Men	M	64.28	72.13	63.91	67.42	70.00	62.15
	σ	10.50	14.17	13.60	11.75	..	11.56
	σ_m	1.60	5.36	2.24	2.11	..	1.48
	n	43	8	37	31	2	61
Women	M	63.94	72.20	62.43	67.27	58.00	59.63
	σ	12.52	11.58	13.70	11.78	..	11.03
	σ_m	3.13	5.79	2.02	2.15	..	1.50
	n	17	5	46	30	1	54

Much the highest average in Mathematics is that of the Honours graduates in Mathematics; then come (in order) those who passed in First Ordinary Mathematics, those who failed in First Ordinary, those who took Honours in other subjects, those who took the Second Course, lastly those who took no Mathematics at the University. In both English and Mathematics the mean of those who dropped the subject in proceeding to the University

is below the mean of the rest, in Mathematics significantly so. The superiority in point of mean Leaving Certificate mark of those who took the First Ordinary Course over those who took the Second is also noteworthy.

There is no significant difference between the means of the men and of the women.

TABLE XL

Showing mean, standard deviation, etc., in Latin.

Mean Leaving Certificate (Higher) mark in Latin for all = 62.17

		Passes.		Passes.		Fail.	Non-Latin.
		Honours Course in Subjects other than Classics.	Honours Course in Latin.	2nd Course in Latin.	1st Ordinary Course in Latin.	1st Ordinary Course in Latin.	
Men and Women	M	65.05	64.00	61.68	61.98	..	61.85
	σ	9.22	11.24	7.95	9.72	..	9.21
	σ_m	1.50	4.25	1.73	1.39	..	1.26
	n	37	8	22	49	..	53
Men	M	66.28	60.33	62.22	64.72	..	61.41
	σ	9.18	10.69	8.20	9.64	..	10.06
	σ_m	1.96	4.32	2.90	1.97	..	2.07
	n	23	6	9	25	..	27
Women	M	63.07	75.00	61.31	59.13	..	62.31
	σ	8.85	..	7.72	8.95	..	7.50
	σ_m	2.46	..	2.23	1.87	..	1.50
	n	14	2	13	24	..	26

This table presents some singular features. The average Leaving Certificate mark of the two women who took Honours is far superior to that of the Honours men, which indeed is lower than that of any other group of men in the table, lower even than the average of those who took no Latin at the University. The average of the men who took First Ordinary Latin is higher than that of those who took the Second Course. The highest average among the men belongs to those who took Honours in other

subjects. It is evident that the men who took Honours in Latin did not do so because of their initial superiority in the subject—see also Table LII, and remarks thereon. There are no failures: if the Leaving Certificate marks are a guide those who dropped Latin at the University would have passed if they had proceeded with it. The frequencies, however, and the differences between the means are so small that there is only one difference that is statistically significant, namely, that between the means of the men and women who took the First Ordinary Course.

TABLE XLI

Showing mean mark in Greek.

Mean Leaving Certificate (Higher) mark in Greek for all = 65.96

		Passes.		Passes.		Fail.	Non-Greek.
		Honours Course in Subjects other than Classics.	Honours Course in Greek.	2nd Course in Greek.	1st Ordinary Course in Greek.	1st Ordinary Course in Greek.	
Men and Women	M n	59.67 3	72.40 5	67.20 5	71.00 10	.. ..	58.63 8
Men	M n	59.67 3	71.00 4	63.50 2	71.38 8	.. ..	58.33 6
Women	M n	.. ..	78.00 1	69.67 3	69.50 2	.. ..	59.50 2

The numbers in Greek are so small that only the means have been calculated. Those who took Honours in Greek have the highest Leaving Certificate average, but it is very little higher than that of those who took only the First Ordinary Course, and who might well (it seems) have gained Honours if they had carried on their Greek. Again, the First Ordinary students show a higher Leaving Certificate mean than the Second Ordinary. There are no failures.

The one woman who took Honours was much above the Leaving Certificate average of the men.

TABLE XLII

Showing mean, standard deviation, etc., in French.

Mean Leaving Certificate (Higher) mark in French for all = 59.72

		Passes.		Passes.		Fail.	Non-French.
		Honours Course in Subjects other than French.	Honours Course in French.	2nd Course in French.	1st Ordinary Course in French.	1st Ordinary Course in French.	
Men and Women	M	62.11	64.78	62.58	57.25	50.12	59.18
	σ	8.67	9.69	8.43	15.91	8.62	12.20
	σ_m	1.09	3.33	0.94	2.07	3.26	1.09
	n	63	9	80	59	8	125
Men	M	59.66	66.80	66.56	55.24	45.00	58.58
	σ	9.05	2.99	6.93	9.03	..	12.72
	σ_m	1.45	1.49	2.45	2.02	..	1.38
	n	39	5	9	21	2	85
Women	M	66.08	62.25	62.08	58.36	51.83	60.45
	σ	8.03	..	8.60	18.66	9.34	11.00
	σ_m	1.68	..	1.02	3.03	4.17	1.74
	n	24	4	71	38	6	40

The mean Leaving Certificate marks in French follow nearly the same order as in English, though the superiority of those who took Honours in French over those who took Honours in other subjects or the Second Course in French is less marked. There is one striking difference, however, between the men and the women: the mean Leaving Certificate mark of the men who took Honours in French is considerably higher than that of those who took Honours in other subjects; with the women the reverse is the case. Apparently many girls who have done very well in French at school drop it when they go to the University.

TABLE XLIII

Showing mean, standard deviation, etc., in German.

Mean Leaving Certificate (Higher) mark in German for all=64.81

		Passes.		Passes.		Fail.	Non-German.
		Honours Course in Subjects other than German.	Honours Course in German.	2nd Course in German.	1st Ordinary Course in German.	1st Ordinary Course in German.	
Men	M	63.09	71.2	64.69	66.0	..	60.27
and	σ	12.46	9.61	7.44	12.15	..	7.03
Women	σ_m	3.94	4.85	1.58	6.07	..	2.22
	n	11	5	23	5	..	11

The mean Leaving Certificate mark of those who took Honours in German is higher than that of any of the other groups. Once more the First Ordinary students show a higher mean than the Second Ordinary. There were no failures, but the Leaving Certificate mean of those who dropped German was definitely below that of those who pursued it.

The numbers in German are small, and the marks of men and women have not been entered separately in the table.

TABLE XLIV

Showing mean, standard deviation, etc., in Science.

Mean Leaving Certificate (Higher) mark in Science for all = 60.57

		Passes.		Passes.		Fail.	Non-Science.
		Honours Course in Subjects other than Science.	Honours Course in Science.	2nd Course in Science.	1st Ordinary Course in Science.	1st Ordinary Course in Science.	
Men and Women	M	64.18	67.51	60.24	54.38	56.5	61.86
	σ	9.15	12.41	8.09	12.56	..	9.29
	σ_m	2.88	2.58	1.42	2.37	..	1.79
	n	11	24	33	29	2	28
Men	M	63.10	68.12	60.14	53.0	63	61.1
	σ	9.60	13.40	8.34	8.12	..	9.45
	σ_m	3.20	3.25	1.60	2.16	..	2.11
	n	10	18	28	15	1	21
Women	M	75	65.67	60.8	55.86	50	64.14
	σ	..	8.76	6.52	16.03	..	8.79
	σ_m	..	3.82	3.21	4.04	..	3.59
	n	1	6	5	14	1	7

The mean Leaving Certificate marks of men and women taken together decrease in this order: Honours Science, Honours in other subjects, Non-Science, Second Course in Science, Fail, First Course in Science. The failures are so few that little importance can be attached to their mean mark; but the high average of those who dropped Science on going to the University is noteworthy, especially in contrast with Mathematics.

There is no significant difference between the means of men and women.

To sum up. Except in Latin, the mean Leaving Certificate mark gained in a subject by students who took Honours in that subject was higher than the mean of any of the other groups shown in the tables.

Except in Mathematics, German, and Greek the mean Leaving Certificate mark of those who graduated with Honours in some other subject was very near that of those who took Honours in the subject.

On the whole, those who failed in the degree examination had a poor average at the Leaving Certificate examination.

There were no failures in Latin, Greek, or German among the cases investigated.

The most singular feature in all these tables is the low average Leaving Certificate mark in Latin of the *men* who took Honours in that subject. This is not the only singularity that the Classics Honours group presents (see pp. 108-9). The apparent anomaly that in Mathematics, Latin, Greek, and German the mean Leaving Certificate mark of those who passed in the First Ordinary Course is higher than that of those who passed in the Second Ordinary is explained by the fact that the First Ordinary Course includes prospective Honours students who do not take the Second Ordinary Course but proceed direct to the Intermediate Honours or Honours Course.

The percentages of students who included subjects in their Leaving Certificate which they did not prosecute further at the University are as follows:—

English	.	.	.	.	.	46
French	.	.	.	.	.	36
Mathematics	.	.	.	.	.	34
Latin	.	.	.	.	.	31
Greek	.	.	.	.	.	26
Science	.	.	.	.	.	22
German	.	.	.	.	.	20

VI

FURTHER ANALYSIS OF RELATION BETWEEN LEAVING CERTIFICATE MARKS IN INDIVIDUAL SUBJECTS AND UNIVERSITY SUCCESS IN THESE AND OTHER SUBJECTS

THE analysis begun in the preceding section is carried further in the following tables (XLV-LI), which show the frequency, mean, and standard deviation of the Leaving Certificate marks obtained by students in the following groups:—

- A. Honours M.A., graduated.
- B. Ordinary M.A., „
- C. „ M.A., not yet graduated.
- D. Honours M.A., „ „
- E. „ B.Sc., graduated.
- F. Ordinary „ „
- G. B.Sc., not yet graduated.
- H. LL.B. „ „

These tables also take account of the different classes of Honours and of the number of “attempts” in Ordinary degree examinations.

A general summary of the results in individual subjects follows Table LI (*b*).

TABLE XLV (a)
ENGLISH (Men)

	A Group. Hons. M.A. Graduates.			B Group. Ordinary M.A. Graduates.			C Group. Ordinary M.A., not completed.			D Group. Hons. M.A., not com- pleted.			E Group. Hons. B.Sc. Graduates.			F Group. Ordinary B.Sc. Grad- uates.			G Group. Ordinary B.Sc., not completed.			H Group. LL.B., not com- pleted.			
	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.	σ.	
Non-English ¹	20	65.50	9.72	28	57.00	6.34	26	58.46	7.17	5	59.40		13	60.00	6.86	2	51.50			13	56.69	6.50	2	65.00	
Ordinary English ² { 1st attempt	22	65.14	6.38	17	61.00	7.12	4	63.75	..	2	59.50														
2nd "				2	54.00	..	4	62.00																	
Fail				1	50.00	..	1	54.00	..	1	56.00														
Total	22	65.14	6.38	20	59.75	7.52	9	61.89	10.14	3	58.33														
English ³ { 1st attempt	1	54	..	11	63.27	7.69																			
2nd "	1	60	..	1	53.00	..	1	59.00																	
Course) { Fail				1	54.00	..																			
Total	2	57	..	13	61.77	7.80	1	59.00																	
Inter. ⁴ Eng. { 1st attempt	14	66.00	5.90							2	59.50														
Language { 2nd "	1	72.00																							
Total	15	66.40	5.90							2	59.50														
Honours—																									
1st Class	5	70.20	1.72																						
2nd "	10	64.50	6.21																						
3rd "	1	60.00																							
Total	16																								

¹ Those who did not take English in their University course. ² First Ordinary course.
³ Second Course. ⁴ Intermediate Honours. ⁵ 1st attempt means passed at first attempt.

TABLE XLVI (a)

MATHEMATICS (Men)

INDIVIDUAL SUBJECTS

	A Group.			B Group.			C Group.			D Group.		E Group.			F Group.		G Group.			H Group.	
	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.	n.	Mean.	σ.	n.	Mean.	n.	Mean.	σ.	n.	Mean.
Non-Mathematics	28	62.00	9.44	11	57.73	11.60	15	67.53	13.30	4	62.75				1	52.00	1	39.00		1	65.00
Ordinary Mathematics—																					
1st attempt .	9	72.22	13.41	26	62.93	10.68	10	69.20	15.46	4	72.00	12	67.42	12.17	1	53.00	10	67.00	10.90	1	87.00
2nd " .				2	43.00		1	62.00				1	72.00				1	52.00			
Fail .							1	71.00													
Total .	9	72.22	13.41	28	61.50	11.84	12	68.75	14.27	4	72.00	13	67.77	11.76	1	53.00	12	65.92	16.83	1	87.00
Mathematics (2nd Course)—																					
1st attempt .	9	72.22	13.41	20	62.00	14.47	3	63.33		3	75.33	3	76.33							1	87.00
2nd " .				4	56.50												1	50.00			
3rd " .																					
4th " .																					
Fail .							1	44.00													
Total .	9	72.22	13.41	24	61.04	12.06	4	58.50		3	75.33	3	76.33				2	63.00			
Honours—																	3	58.67		1	87.00
1st Class .	1	98.00																			
2nd " .	6	68.50																			
Total .	8 ¹	72.13																			

¹ One student was awarded Honours but no class was shown.

TABLE XLVI (b)
MATHEMATICS (Women)

	A Group. ¹			B Group.			C Group.			D Group.		E Group.		F Group.			G Group.	
	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.	n.	Mean.	n.	Mean.	σ.	n.	Mean.
Non-Mathematics .	15	62.80	12.92	25	54.64	7.02	9	61.89	9.34	3	77.33	1	63.00	1	34.00		1	60.00
1st attempt .	6	73.83		56	65.45	12.56	9	59.78	14.81					1	67.00		1	65.00
2nd " .				5	64.40		2	63.50										
3rd " .							2	37.00										
Fail .							2	58.00										
Total .	6	73.83		61	65.36	12.53	14	56.93	15.31					2	50.50		1	65.00
2nd Course .	5	72.20		28	66.61	13.14	2	61.50										
2nd attempt .				12	56.92	12.35	1	55.00										
3rd " .				1	57.00		2	44.50										
Fail .							2	42.00										
Total .	5	72.20		41	63.54	13.52	7	50.14										
Honours—																		
1st Class .	1	71.00																
2nd " .	3	75.00																
3rd " .	1	65.00																
Total .	5	72.20																

¹ See p. 94.

TABLE XLVII (b)

LATIN (Women)

	A Group. ¹			B Group.			C Group.			D Group.	
	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.
Non-Latin	9	64.00	6.38	11	61.64	7.61	4	60.25		2	62.50
Ordinary Latin	7	65.29	11.81	25	60.12	7.98	7	61.71	9.69	2	62.20
Latin { 1st attempt (2nd Course) } 2nd "	2	61.50		8 1	62.00 58.00	8.31	2	60.00			
Latin (2nd Course) Comp.	2	61.50		9	61.56	7.93	2	60.00			
Intermediate Latin	2	61.50		1	77.00		1	73.00			
Honours— 1st Class	2	75.00									

¹ See p. 94.

TABLE XLVIII (a)
GREEK (Men)

	A Group.		B Group.		C Group.		D Group.		H Group.	
	n.	Mean.	n.	Mean.	n.	Mean.	n.	Mean.	n.	Mean.
Non-Greek . . .	2	60.50	1	67.00	1	63.00	1	64.000	1	35.00
1st Course— 1st attempt . . .	5	68.4	5	68.8	4	74.00				
2nd Course— 1st attempt . . .			2	63.5						
Honours—										
1st Class . . .	1	80.00								
2nd " . . .	3	68.00								
Total . . .	4	71.00								

TABLE XLVIII (b)
GREEK (Women)

	A Group.		B Group.		C Group.	
	n.	Mean.	n.	Mean.	n.	Mean.
Non-Greek . . .			1	56.00	1	63.00
1st Course— 1st attempt . . .	1	78.00	3	69.67	2	69.50
2nd Course— 1st attempt . . .			3	69.67	1	65.00
Fail . . .			3	69.67	1	65.00
Total . . .						
Honours— 1st Class . . .	1	78.00				

TABLE XLIX (a)

FRENCH (Men)

	A Group. ¹			B Group.			C Group.			D Group.		E Group.			F Group.		G Group.		
	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.	n.	Mean.	σ.	n.	Mean.	n.	Mean.	σ.
Non-French .	24	60.29	10.08	16	58.94	9.06	19	55.42	10.47	2	54.0	11	59.55	5.40	2	54.5	11	60.36	7.95
Ordinary—																			
1st attempt	11	63.45	7.48	16	58.44	5.03	3	69.66		4	59.0								
2nd "				2	59.5														
3rd "				2	48.5		2 ²	45.0											
Fail .																			
Higher—																			
1st attempt	6	67.33	3.05	2	70.5					2	66.5								
2nd "				2	59.5		2	68.0											
Honours—																			
1st Class .	2	69																	
2nd "	3	65.33																	

¹ See p. 94.

² One failed once and one four times.

TABLE L (a)
GERMAN (Men)

	<i>A Group.</i>		<i>B Group.</i>	
	<i>n.</i>	Mean.	<i>n.</i>	Mean.
Non-German .	2	49·5	1	66
Ordinary German—				
1st attempt .	3	62·33	2	72
2nd „ .			1	57
Total .	3	62·33	3	67
2nd Course—				
1st attempt .	3	62·33	2	72
Honours—				
2nd Class .	1	60		
Total .	1	60		

TABLE L (b)
GERMAN (Women)

	<i>A Group.</i>			<i>B Group.</i>			<i>C Group.</i>		<i>D Group.</i>	
	<i>n.</i>	Mean.	σ .	<i>n.</i>	Mean.	σ .	<i>n.</i>	Mean.	<i>n.</i>	Mean.
Non-German .	3	61·33		3	57·33		2	70·5		
Ordinary German—										
1st attempt .	8			15	64·47	6·67	1	80	2	62·5
2nd „ .				1	50					
Total .	8	72·5	10·26	16	63·56	6·58	1	80	2	62·5
German (2nd Course)—										
1st attempt .	6	72·83	10·78	14	64·5	6·02			2	62·5
2nd „ .				1	64					
Total .	6	72·83	10·78	15	64·47	6·67			2	62·5
Honours—										
1st Class .	2	81·5								
2nd „ .	2	66·5								
Total .	4	74								

TABLE LI (a)
SCIENCE (Men)

	A Group. ¹			B Group.			C Group.			D Group.		E Group.			F Group.		G Group.		
	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.	σ.	n.	Mean.	n.	Mean.	σ.	n.	Mean.	n.	Mean.	σ.
Non-Science	10	63.1	9.6				9	60.9	10.29	2	52.0								
Ordinary—																			
1st attempt	8	65.0	12.9	15	54.0	6.5	9	61.0	10.04	1	57.0	13	67.46	13.15	2	50.5	7	64.43	9.84
2nd "				1	68.0		2	58.5		1	50.0						3	54.0	
Failed							1	63.0											
Total	8	65.0	12.9	16	54.88	7.62	12	60.75	9.34	2	53.5	13	67.46	13.15	2	50.5	10	61.3	10.02
Higher—																			
1st attempt	6	68.0	13.5	10	58.40	5.55	2	65.0		2	53.5	13	67.46	13.15	1	50.0	3	72.23	
2nd "				1	55.0		2	64.5											
3rd "							1	75.0							1	51	4	58.50	
Total	6	68.0	13.5	11	58.09	5.39	5	66.8		2	53.5	13	67.46	13.15	2	50.5	7	64.0	9.32
Honours—																			
1st Class	1	95.0										4	72.5						
2nd "	4	63.5										9	65.22	12.39					
Total	5	69.8										13	67.47	13.09					

¹ See p. 94.

TABLE LI (b)
SCIENCE (Women)

	A Group. ¹		B Group.			C Group.		D Group.		E Group.		F Group.		G Group.	
	n.	Mean.	n.	Mean.	σ .	n.	Mean.	n.	Mean.	n.	Mean.	n.	Mean.	n.	Mean.
Non-Science . . .	1	75	2	58.5		3	61.6	1	72						
Ordinary—															
1st attempt . . .	5	68.8	12	54.75	7.22	1	80					1	63	1	70
2nd " . . .			1	53		1	51			1	50	1	58	1	54
Failed . . .						1	50								
Total . . .	5	68.8	13	54.6	7.08	3	60.33			1	50	2	60.5	2	62
Higher—															
1st attempt . . .	5	68.8	3	61						1	50	1	58		
2nd " . . .												1	63		
Failed . . .															
Total . . .	5	68.8	3	61						1	50	2	60.5	1	54
Honours—															
1st Class . . .	1	77												1	54
2nd " . . .	4	66.8												1	54
3rd " . . .															
Total . . .	5	68.8								1	50				

¹ See p. 94.

The foregoing tables show that, except in the group of women who graduated with Honours in Mathematics, there is a clear gap, frequently a wide gap, between the Leaving Certificate means of the graduates who gained First Class Honours and those who gained Second Class Honours. The mean Leaving Certificate mark of First Class Honours was always over 70, except in French, where it was 69. The one man who gained a First in Science had a Leaving Certificate mark of 95, and the one man who gained a First in Mathematics had a Leaving Certificate mark of 98! In respect of Leaving Certificate averages, Honours graduates were generally superior to Ordinary graduates, and among the latter those who passed at their first attempt to those who did not. It is interesting to note that the Leaving Certificate means of the students with incomplete degrees compared quite favourably with those of other groups.

There is a noteworthy difference between Honours men and Honours women. The mean Leaving Certificate mark of the First Class Honours men was higher than that of the First Class Honours women, except in English, whereas the mean of the Second Class Honours men was lower than that of the Second Class Honours women, except in French. In the case of First Class Honours, however, the numbers are very small. Among the Ordinary graduates there is no significant difference between the averages of men and women.

As for particular subjects, it may be noted that in English the Honours B.Sc. and non-English Honours M.A. graduates have a higher Leaving Certificate average than the Ordinary M.A., while the Ordinary B.Sc. average is about the same as that of the Ordinary M.A. In Latin the mean of the Second and Third Class Honours graduates is distinctly lower than that of the Ordinary M.A.s. In French the mean of the Second Class Honours women is lower than that of the women who graduated with Honours in other subjects. In Science the mean Leaving Certificate mark of the men who took Honours in other subjects is practically the same as that of the men who gained Second Class Honours in Science. The mean of the Honours B.Sc. men is nearly the same as that of the Honours M.A.s. The Leaving Certificate marks in Science distinguish clearly between the Honours graduate and the Ordinary graduate, but not between the M.A. and the B.Sc.

VII

LEAVING CERTIFICATE MARK IN VARIOUS SUBJECTS OF STUDENTS WHO TOOK HONOURS AT THE UNI- VERSITY IN THE SAME OR OTHER SUBJECTS

TABLE LII shows the mean Leaving Certificate mark in English, Mathematics, and Latin of students who took an Honours degree in English, Mathematics, Classics, Modern Languages, History, or Science.

TABLE LII

University Honours Group (M.A.).	Mean Leaving Certificate Mark in		
	English.	Mathe- matics.	Latin.
English	67·56	61·62	62·00
Mathematics	65·15	72·15	70·40
Classics	57·86	65·00	67·33
Modern Languages	71·86	64·60	64·82
History	66·20	63·00	60·33
B.Sc.	59·29	67·64	50·67

These are very interesting figures. The mathematicians appear to marked advantage; they have the highest Leaving Certificate average not only in their own subject but in Classics also. Those who graduated with Honours in Modern Languages head the list in English, and might have rivalled the mathematicians in general attainment had there been another column to show averages in French. The graduates with Honours in English and Classics appear to less advantage. It is not surprising, perhaps, that the English group have the lowest Leaving

Certificate average in Mathematics; but it is surprising that the Classical Honours graduates should not only be surpassed in Latin by the mathematicians, but should be at the bottom of the list in English, lower even than the B.Sc.s. Are we to infer that a good many able boys—the case seems to be somewhat different with girls—take Latin at school for traditional reasons but specialise in other subjects when they go to college? Other facts already noted seem to point in that direction.

VIII

RELATION BETWEEN LEAVING CERTIFICATE MARKS
IN VARIOUS SUBJECTS AND SUCCESS IN PHILO-
SOPHY AT THE UNIVERSITY

A GREAT many Arts students, both Ordinary and Honours, take Philosophy in their degree course. It should therefore be possible to ascertain with some accuracy how far, if at all, success in school subjects is predictive of success in this purely University subject. Tables LIII, LIV, and LV show the distribution of the marks obtained at first sitting in the examination for the Ordinary degree in Philosophy as compared with the marks awarded by the Department at the Leaving Certificate examination in English, Mathematics, and French respectively. In Table LVI degree marks and University class marks in Philosophy are correlated with Department's marks in English, Mathematics, Latin, and French.

TABLE LIII

Showing distribution of Department's marks in Leaving Certificate for English and of University marks in Philosophy (First Ordinary—first sitting).

		University Marks in Philosophy															
Department's Marks in English		16-19	20-23	24-27	28-31	32-35	36-39	40-43	44-47	48-51	52-55	56-59	60-63	64-67	68-71	72-75	Totals.
	82-85													1		1	2
	78-81								1						1		2
	74-77												3	1			4
	70-73								1		2	3	1	3	1		11
	66-69							1	1	1	1	5	4		1		14
	62-65						1		1	1	6	7	4	2	1	1	24
	58-61						2		1	3	4	10	8	2	3		33
	54-57	1			1	2	5	3	3	3	10	5	1	3	1		38
	50-53				1		1	1	3	6	3	2	3	2			22
	46-49									4							4
	Totals	1	0	0	2	2	9	5	11	18	26	32	24	14	8	2	154

$r = .38$

$PE_r = .047$

TABLE LIV

Showing distribution of Department's marks in Leaving Certificate (Higher) for Mathematics and University marks in Philosophy (First Ordinary).

Department's Marks in Mathematics	University Marks in Philosophy										Totals.
	17-22	23-28	29-34	35-40	41-46	47-52	53-58	59-64	65-70	71-76	
95-100									1		1
89-94							1	1			2
83-88			1	1	1		2	2		1	8
77-82					2	1	1	3	5	1	13
71-76					1	5	2	4	2		14
65-70				1	2	3	6	6	2		20
59-64				1	1	5	6	2	2	1	18
53-58	1			1	2	2	6	4	2		18
47-52			1	1	1	3	9	2	2		19
41-46						1	1	2			4
35-40						1	2				3
29-34							1				1
Totals	1	0	2	5	10	21	37	26	16	3	121

$r = .16$
 $PE_r = .06$

TABLE LV

Showing distribution of Department's marks in Leaving Certificate (Higher) for French and University marks in Philosophy (First Ordinary).

		University Marks in Philosophy														Totals.
		33-35	36-38	39-41	42-44	45-47	48-50	51-53	54-56	57-59	60-62	63-65	66-68	69-71	72-74	
Department's Marks in French	81-83									1						1
	78-80		1					1								2
	75-77											1	1			2
	72-74							1					2			6
	69-71			1	1	1	1		3	4	2					13
	66-68		3		1			1			2		2	2		11
	63-65				1			1	2	3		3	3			16
	60-62				1	1	1	1	3		1		1	1		10
	57-59		2	1		1		1	4	3	1		1			14
	54-56				1		2	1		3	2		1			11
	51-53		1			1	3	2	3	3	1					14
	48-50			1			1	1	2	3	3	2	1	1		15
	45-47									2				1		3
42-44		1		1	2	1	1						1		7	
39-41														1	1	
36-38		1													1	
Totals		1	8	3	6	6	9	11	19	22	16	6	14	5	1	127
		$r = .09$														$PE_r = .059$

TABLE LVI

Showing correlation of degree marks and class marks respectively in Philosophy with Department's marks in Leaving Certificate (Higher) for English, Mathematics, Latin, and French.

Correlation between Philosophy and .	English.			Mathematics.			Latin.			French.		
(Degree or Class Mark.)	<i>n.</i>	<i>r.</i>	PE_r	<i>n.</i>	<i>r.</i>	PE_r	<i>n.</i>	<i>r.</i>	PE_r	<i>n.</i>	<i>r.</i>	PE_r
Degree Mark in Phil- osophy and . . .	154	0.38	0.047	121	0.16	0.06	73	0.12	0.078	127	0.09	0.04
Class Mark in Phil- osophy and . . .	157	0.34	0.048	125	0.20	0.058	73	0.10	0.078	128	0.20	0.04

The correlations between the degree marks and the Department's marks do not differ appreciably in any subject from the correlations between the class marks and the Department's marks. They are all low. In Mathematics, Latin, and French they are very low, and even in English they are not high. Yet the correlations in English are so much higher than in the other subjects as to suggest that success in English at the Leaving Certificate examination, though by no means a sure indication of success in Philosophy, is at least a better indication of it than success in Mathematics, Latin, or French.

IX

RELATION BETWEEN DEPARTMENT'S MARKS OR TEACHERS' MARKS IN VARIOUS SUBJECTS IN THE LEAVING CERTIFICATE, AND SUCCESS IN NATURAL PHILOSOPHY (PHYSICS) AT THE UNIVERSITY.

THE following tables show for Natural Philosophy (Physics) what the preceding tables have shown for Mental Philosophy. Natural Philosophy is not so foreign to the ordinary Secondary School curriculum as Mental Philosophy, so that higher correlations might reasonably be expected.

TABLE LVII

Showing correlations between class marks in Natural Philosophy (Physics) and Department's marks in Leaving Certificate (Higher) for English, Science, and Mathematics.

	<i>n.</i>	<i>r.</i>	PE _{r.}
English	100	0.38	0.06
Science (Higher) . . .	73	0.47	0.06
Mathematics (Higher) .	98	0.27	0.06

TABLE LVIII

Showing mean Department's and Teachers' marks in Leaving Certificate in English, Higher Mathematics, and Higher Science, of students who passed in, failed in, or were exempt from the Ordinary degree examinations in Natural Philosophy (Physics).

	Men and Women.					
		Pass. ¹	Fail. ¹	Exempt.	Non-Exempt.	Total.
Department's Marks.	English .	56.4	53.5	60.9	55.1	57.9
		(29)	(22)	(49)	(51)	(100)
	Maths. .	61.8	65.2	72.0	63.3	67.7
		(27)	(22)	(49)	(49)	(98)
	Science .	58.0	54.9	66.5	56.7	61.9
		(20)	(14)	(39)	(34)	(73)
Teachers' Marks.	English .	56.6	56.5	62.9	56.5	59.7
		(27)	(19)	(47)	(46)	(93)
	Maths. .	60.5	63.6	68.7	61.9	65.3
		(26)	(22)	(47)	(48)	(95)
	Science .	58.9	59.5	65.8	59.2	62.8
		(18)	(12)	(37)	(30)	(67)

¹ All figures in these "Pass" and "Fail" columns refer to first attempts.
The figures in brackets show frequencies.

The first of these two tables shows that there is some relation, though not a very close relation, between success in these three subjects at school and success in Natural Philosophy (Physics) at the University. The relation is naturally closest in the case of Science, since the school course in Higher Science serves to some extent as an introduction to the University course in Natural Philosophy. If the relation between English and Natural Philosophy is not very close, it is still quite as close as the relation between English and Mental Philosophy. But it is

surprising that the correlation of Mathematics with Natural Philosophy (Physics) should be so low; it may be partly because admission to a graduation course in Natural Philosophy is conditional on the student having passed in Mathematics on the Higher Standard or produced some other evidence of proficiency in Mathematics, so that only one end of the distribution is considered here.

The same surprise, however, awaits us in the second table, where it appears that both the Department and the teachers have given a higher average mark in Mathematics to the pupils who afterwards failed than to those non-exempt students who afterwards passed in the Ordinary degree examinations in Natural Philosophy (Physics). Otherwise both the teachers' marks and the Department's marks gave a sound indication of what was likely to happen in the degree examinations. In every case the mean mark of the "Exempts" is higher than that of the "Non-exempts," the difference being slightly greater in the case of the Department's marks than in the case of the teachers' marks. As between "Passes" and "Fails" also, the Department's marks are the better guide. Except in Mathematics, where the prognostications of both the Department and the teachers are wrong, the Department's mean marks are higher for the "Passes" than for the "Fails," while the teacher's mean mark is higher for the "Fails" than for the "Passes" in Science, and in English is almost the same.

PART III

GENERAL SUMMARY

THE object of this inquiry was to investigate the prognostic or predictive value of the qualifications on the strength of which a student enters the University, *i.e.* the extent to which success in an entrance examination is an augury of success in University studies.

At the secondary school-leaving age (16–18½) two measures were available: (A) teachers' estimates in individual subjects based on the pupils' class work together with the general estimate of the Head Teacher, and (B) the marks based on the Leaving Certificate examination conducted by external examiners under the supervision of the Scottish Education Department. There are also two sets of data from which it is possible to estimate University success: (C) the students' marks in the class examinations set throughout the session by the professors themselves, and (D) the marks in the degree examinations set conjointly by the professors and external examiners in the various subjects at the end of each session for the ordinary degree, or at the end of the four or five years' course for the Honours degree.

These marks were collected and statistically analysed for a group of students who had entered on degree courses in Arts or Pure Science at one of the Scottish Universities in the autumn of 1928. This group contained 231 men and 241 women, a total of 472. In this group 266 were admitted solely on the results of the Leaving Certificate Examination and 84 others on a combination of this examination with another. The conclusions reached in this Report are based on these data. (See pp. 15–16.)

On the one hand, there are the Head Teacher's general estimate, the teachers' estimates in special subjects, the collective value of the Leaving Certificate, the number and grades of passes it contains, and the marks of the Department's revisers in special

subjects; on the other, the class of Honours a student obtained if he took an Honours degree at the University, or, if he did not, the number of years he required to graduate, the number of failures, if any, in degree examinations, and the marks he obtained in class and degree examinations. (See p. 19.)

I. On the whole, Head Teachers' estimates are higher for those students who obtained Honours than for those who did not; and among Honours graduates slightly higher for the Firsts than for the Seconds, and for the Seconds than for the Thirds. There is not much difference in their estimates of those who took Ordinary degrees and of those whose degrees were incomplete at Easter 1933, while their estimates of those who discontinued their courses are, on the whole, similar to their estimates of the Honours rather than of the Ordinary graduates. While some students discontinued their courses because of repeated failure in examinations, many others had excellent University records. (See p. 20 *et seq.*)

II. In a group of 43 students whose Composite Marks¹ in the Leaving Certificate Examination were 70 or over, 28 took Honours of the First or Second Class, 10 took Ordinary Degrees, 5 discontinued their courses, and there were none who did not complete their degrees; whereas of the 62 students with Composite Marks below 50, 2 obtained First or Second Class Honours, 39 took Ordinary degrees, 11 failed to complete, 6 discontinued, and 4 took no examinations. The mean Composite Mark of Honours graduates is higher than that of Ordinary graduates, which in turn is higher than that of those who had not completed their degrees, but slightly lower than that of those who discontinued. As between Men and Women the First Class Honours men have a lower mean Composite Mark than the First Class Honours women, while among Third Class Honours graduates the reverse holds. There is no significant difference between men and women in other categories. (See pp. 23-25.)

III. The average number of Higher Grade passes in the Leaving Certificate examination obtained at the first sitting was highest among those who afterwards graduated with Honours; there was no difference between those who had obtained an Ordinary degree and those who had not yet graduated in 1933. (See pp. 26-28.)

IV. The mean number of failures in University Degree

¹ For method of estimating composite mark see p. 23.

Examinations increases as the number of Higher Grade Leaving Certificates decreases. (See p. 28 and Table VII (γ), p. 29.)

V. Although a higher proportion of Honours graduates than of Ordinary graduates remains at school an additional year after completing their Leaving Certificate, the data afford no conclusive evidence as to the value of the additional year at school. The Honours graduates passed their Leaving Certificate examination at an earlier age than the Ordinary graduates. (See pp. 33-34.)

VI. The average age at entrance of the students who graduated with Honours was 18 years 8 months, which is the same as that of those who took a Pass degree in three years and only about a month less than that of those who took a Pass degree in four years. The dispersions of these three groups differ only slightly. (See pp. 35-36.)

VII. Of the 472 students, 17 reported themselves as employed during their University course, but only in one instance was it found that the duration of the course was affected by such employment. (See p. 37.)

VIII. As regards marks in individual subjects, the correlations between the teachers' estimates and the Leaving Certificate Examination marks vary from $\cdot 37$ for Latin to $\cdot 69$ for Science, with an average of $\cdot 55$. (See p. 45.) Correlations between class and degree marks at the University vary from $\cdot 51$ for Mathematics to $\cdot 85$ for German, with an average of $\cdot 69$. (See p. 55.) Thus there is slightly closer agreement between the two University estimates than between the two school estimates which are given by different authorities.

There is no significant difference between the prognostic value of teachers' marks and that of the Department's marks for success either in the University class examinations or in the degree examinations. A striking fact is the smallness of some of the correlation coefficients in Mathematics, English, and Latin (the coefficient in degree Mathematics was influenced by the fact that students who have reached a good standard in class examinations are exempted from the degree examination). All the correlations have indeed been affected by the fact that the data refer only to the pupils successful at the Leaving Certificate examination. In considering the value of the teacher's estimate one has to bear in mind that it can hardly fail to be influenced

by his experience of the objective standard of the Leaving Certificate examination. (See p. 84.)

IX. When the Honours group are considered alone and their Leaving Certificate marks in English, Mathematics, and Latin compared, the following interesting conclusions emerge:¹ The mathematicians have the highest Leaving Certificate average not only in their own subject, but in Classics also. The Modern Language Honours graduates head the list in English, and might have rivalled the mathematicians in general attainment had the Leaving Certificate marks in French been similarly worked out. The graduates with Honours in English and Classics appear to less advantage. It is not surprising, perhaps, that the English group have the lowest Leaving Certificate average in Mathematics; but it is surprising that the Classical Honours graduates should not only be surpassed in Latin by the mathematicians, but should be at the bottom of the list in English, lower even than the Science graduates. (See pp. 108-109.)

X. The correlations between Leaving Certificate marks in English, Mathematics, Latin, and French, and class or degree marks in the purely University subject of Philosophy are all low with the possible exception of English (.38). (See pp. 110-112.)

XI. Natural Philosophy (Physics) University marks give a correlation of .47 with Higher Science Leaving Certificate marks, .38 with English, but only .27 with Mathematics. (See pp. 113-115.)

Throughout it should be remembered that the data were derived from the entrants to one Scottish University in one session only, and, in interpreting the results, that no information was available regarding the success that pupils who did not enter for or who failed in the Leaving Certificate examination might have had at the University had they been admitted.

¹ See Table LII.

The Scottish Council
for Research in Education

SERIAL NUMBER

SCOTTISH
UNIVERSITIES
ENTRANCE BOARD
NUMBER

INTERNATIONAL
EXAMINATION INQUIRY

Name

Surname.....

Christian Name(s)

Schools.....

A (1) SCHOOL AND SCOTTISH LEAVING CERTIFICATE EXAMINATION RECORD
Percentage marks with Grades (Higher or Lower), in—

DATE OF BIRTH (Day, Month, Year)	YEAR(S) OF PRESENTATION FOR LEAVING CERTIFICATE	PASS OR FAIL	English*		Maths.		Latin		Greek		French		German		Science		Art		Other Subjects (specify)				Head Teacher's Opinion
			Teach. Mark	L.C. Mark	Teach. Mark	L.C. Mark	Teach. Mark	L.C. Mark	Teach. Mark	L.C. Mark	Teach. Mark	L.C. Mark	Teach. Mark	L.C. Mark	Teach. Mark	L.C. Mark	Teach. Mark	L.C. Mark	Teach. Mark	L.C. Mark	Teach. Mark	L.C. Mark	

* Write Grade L. or H. under subject.

A (2) SCOTTISH UNIVERSITIES ENTRANCE BOARD ATTESTATION OF FITNESS (IF NOT WHOLLY BY SCOTTISH LEAVING CERTIFICATE)
Subjects embraced by the Certificate and Grade of Pass in each subject (with percentage marks if available)

NATIONALITY.....

Name of Certificate on which claim for Admission is based	Date of Certificate	English		Maths.		Latin		Greek		French		German		Science		Other Subjects (specify)				Date of Granting Admission
		Grade	Mark	Grade	Mark	Grade	Mark	Grade	Mark	Grade	Mark	Grade	Mark	Grade	Mark	Grade	Mark	Grade	Mark	

Surname.....Initials.....

B UNIVERSITY RECORD

Date	Degree Examinations	Class Marks, Places, Certificates, Medals, etc.
June 1929		
September 1929		
June 1930		
September 1930		
June 1931		
September 1931		
June 1932		
September 1932		

PARTICULARS OF DEGREE (Class in Honours, etc.)

C AFTER UNIVERSITY RECORD

APPENDIX II

AFTER UNIVERSITY EMPLOYMENT OF STUDENTS

TABLE A

Showing types of employment obtained as at Easter, 1934, by students with Honours or Ordinary M.A. or B.Sc. degree.

Men

Degree.	Teaching.	Law.	Inland Revenue.	Customs and Excise.	Banking and Accountancy.	Ministry of Labour.	Journalism.	Secretarial Work.	Church.	Chemistry.	Salesmanship.	League of Nations.
Hons. M.A.	5	1	1	1		1	1	1		1		1
Ord. M.A.	22	4 ¹	1		2		1		1			
Ord. M.A., incomplete					2	1					1	
Hons. B.Sc.	5									1		
Ord. B.Sc.												
Totals .	32	5	2	1	4	2	2	1	1	2	1	1

¹ Law apprentices.

Besides the above, two students with incomplete Ordinary M.A. degrees are in regular employment, one as a furniture dealer and one as a hotel porter, and one student with a complete M.A. degree is getting casual labour on farms.

Women

Degree.	Teaching.	Clerking.	Typing.	Secretarial Work.	Governess.	Civil Service.	Ministry of Health.	Board of Fisheries.	Costing.	Social Work.	Married.
Hons. M.A.	5	1		1							
Ord. M.A.	48		1	7					1	4	1
Ord. M.A., incomplete	3	1	1	2	1	1	1				
Hons. B.Sc.								1			
Ord. B.Sc.	1										
Totals .	57	2	2	10	1	1	1	1	1	4	1

TABLE B

Showing numbers of students employed, unemployed, or completing post-graduate study or training as at Easter, 1934.

Type of Degree.	Employed.		Unemployed.		Completing Post- Graduate Study or Training.
	Teachers.	Others.	Trained as Teachers.	Others.	
<i>Men and Women</i>					
Hons. M.A. . . .	10	9	37	2	34
Ord. M.A. . . .	68	19	47	5	36
Ord. M.A., incomplete	3	13	2	1	4
Hons. B.Sc. . . .	4	3	2	1	10
Ord. B.Sc. . . .	1	1	3	..	1
Totals . . .	86	45	91	9	85
<i>Men</i>					
Hons. M.A. . . .	5	7	22	1	23
Ord. M.A. . . .	21	5	8	1	20
Ord. M.A., incomplete	..	6	..	1	2
Hons. B.Sc. . . .	4	2	2	1	8
Ord. B.Sc. . . .	..	..	2	..	1
Totals . . .	30	20	34	4	54
<i>Women</i>					
Hons. M.A. . . .	5	2	15	1	11
Ord. M.A. . . .	47	14	39	4	16
Ord. M.A., incomplete	3	7	2	..	2
Hons. B.Sc. . . .	..	1	..	..	2
Ord. B.Sc. . . .	1	1	1	..	..
Totals . . .	56	25	57	5	31

This table contains information concerning 316 students.

The remaining 156 are formed of two groups:

- (1) Those who are still attending classes at the University.
- (2) Those who have now left the University and about whom no information has been obtained.

APPENDIX III

STUDENTS WHO DISCONTINUED UNIVERSITY COURSE
AND WHO GAVE REASONS FOR DOING SO

	Men.	Women.
Entrance qualifications not completed . . . . .	..	1
Failed in degree examinations	4	..
Transferred to new course—University or other	4	5
Left to take situation	3	6
Entered Divinity Faculty as non-graduates .	3	..
Ill-health . . . . .	..	4
Home circumstances	1	3

These figures represent only about one-third of the total number who discontinued, the others not having returned the questionnaire on After-careers.

APPENDIX IV

NOTE ON STATISTICAL TERMS USED IN THIS REPORT

The *mean* of a set of values is found, as every schoolboy knows, by dividing their sum by their number. It is a measure of the central tendency of the group. For the benefit of the lay reader who is unfamiliar with statistical methods, it may be advisable to point out that the *median* is another measure of central tendency; it is the middle value when all the values are arranged in descending order of magnitude; it is quickly found, it is useful where (as in Table V) the values are not expressed numerically, and it usually has nearly the same value as the mean.

Two sets of marks may differ in another respect, namely, in *scatter* (called also *dispersion*); in one set the individual marks may cluster closely round the mean, whereas in the other they may be widely scattered; for example, two sets of marks may have actually the same mean, 60, but in one set they may range from 55 to 65, while in the other they may run from 40 to 80. The most commonly used measure of this scatter is the standard deviation (σ); it is the square root of the mean of the squares of the differences between the individual values and their mean. If n be the number of values, and x be the difference between their mean and one of them, then

$$\sigma^2 = \frac{\sum(x^2)}{n}$$

In Table XXXIX the mean mark of the men who took Honours in subjects other than Mathematics was 64.28, which is nearly the same as 63.94, the mean mark of the women; but the standard deviation of the women was greater, showing that there was greater variability in their marks.

The *probable error* (P.E.) is another measure of dispersion. It is about two-thirds (more exactly .6745) of the standard deviation. In a *normal* distribution half of the values lie between the limits (Mean + P.E.) and (Mean - P.E.), while .68 of them lie between the limits (Mean + σ) and (Mean - σ).

For a full explanation of the meaning and use of *the standard*

error of a mean (σ_m) a text-book of statistics should be consulted. Suppose we know the Leaving Certificate marks in Mathematics of all candidates, and know that their mean is M and their standard deviation σ . If samples of (say) 100 be taken at random (each being replaced before the next is taken), then their means, m_1, m_2, m_3 , etc., will not all be exactly equal to M , the mean of the whole; but they will not differ very much from it. If the differences $M-m_1, M-m_2, M-m_3$, etc., be plotted, they will in general give a curve with a standard deviation of $\frac{\sigma}{\sqrt{n}}$, where

σ is the standard deviation of the whole. This value (which has been written σ_m in our tables) is the standard error of the means. Since in practice we do not know the standard deviation of the whole, but only that of a sample, it is customary to take the standard deviation of the sample as the best estimate of that of the whole.

The standard error of the mean enables us to estimate the significance of *the difference between two means*. If two samples be taken of marks gained in a subject by the *same* students, their means will generally be only slightly different; if the samples be the marks of *different* students, the difference between their means may be great or small. The question arises: How great must the difference be before we can say with fair certainty that it indicates a real difference and that it is probably not the sort of difference that arises in random sampling? For practical purposes it can be taken that a difference is significant if it be twice its standard error, for the odds are 20 to 1 against getting it by mere chance in samples of a homogeneous population; if it be two and a half times its standard error the odds are 100 to 1. Now the standard error of a difference between two means is

$$\sqrt{\sigma_{m_1}^2 + \sigma_{m_2}^2}$$

where σ_{m_1} and σ_{m_2} are the standard errors of the means in question.

In Table XXXIX the difference between the means of the two groups of Honours students (64.18 and 72.16) is 7.98, and its standard error is $\sqrt{1.01^2 + 3.82^2}$, which is 3.95. 7.98 is about twice 3.95, hence the difference between the means of the two Honours groups is probably not an accidental one—in fact the odds against its being a chance difference are 20 to 1.

A *correlation coefficient* is a measure of relationship between two sets of values. If, when Leaving Certificate marks and teachers' estimates are tabulated side by side, it is found that there is perfect correspondence between them so that when they are plotted on squared paper the points representing them lie along a straight line, then the correlation coefficient is unity; when there is no relationship between the marks the correlation is zero. Between perfect and zero correlation there are all degrees which are represented by fractions between 0 and 1.

The coefficient (r) given in the tables has been found by the "product-moment" formula

$$r = \frac{\Sigma(xy)}{n\sigma_x\sigma_y}$$

where x and y are marks, *e.g.* Leaving Certificate mark and degree mark, measured from their means, and σ_x is the standard deviation of one set of marks and σ_y is that of the other.

The *probable error* of r which is given in the tables has been found by the formula

$$PE_r = \frac{.6745(1 - r^2)}{\sqrt{n}}$$

To find whether a correlation coefficient is significantly different from zero one must take as the probable error $\frac{.6745}{\sqrt{n}}$ (or more exactly $\frac{.6745}{\sqrt{n-1}}$) where n is the frequency. Where a coefficient is more than three times this value, it may be regarded as significant, the odds being 20 to 1.



